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Editorial

Con el Volumen VII iniciaremos nuestro séptimo año de publicaciones, y al llegar a esta etapa de nuestras labores no podemos dejar de sentir un orgullo legítimo de haber logrado parcialmente la meta a que aspiramos en 1941. De un principio humilde, con el camino sembrado de dificultades económicas, hemos logrado elevar el Boletín a un plano superior. Hemos obtenido el reconocimiento oficial de dos Ministerios que lo han convertido en órgano oficial de sus Departamentos de Entomología y ahora cubren los gastos de impresión. En vista de estos adelantos, se han producido cambios en nuestra administración y, de ahora en adelante, el Dr. Francisco Fernández Yépez, encargado del Departamento de Entomología del Ministerio de Agricultura y Cría, ocupará el cargo de administrador del Boletín y de sus finanzas; la dirección técnica del boletín estará a cargo de su fundador, Pablo J. Anduze, y el comité de redacción estará constituído por los Drs. Chas. H. Ballou, Enrique G. Vogelsang, Félix Pifano C. y René Lichy.

Nos hemos impuesto un plazo de diez años para producir la primera monografía del Boletín que será el CATALOGO DE INSECTOS VENEZOLANOS. A ese fin hemos trabajado todos los coleccionistas venezolanos con empeño infatigable para recoger el material necesario, material que casi en su totalidad ha sido enviado a colegas extranjeros o a grupos de taxonomistas que colaboran en museos o en Institutos del exterior. Muchos de estos entomólogos nos han honrado con su colaboración y, aunque se benefician con parte de nuestras colecciones, les reconocemos y agradecemos su espléndida ayuda. Debemos advertir que, así como algunos han colaborado, también hay otros con las mismas

ventajas que ni siquiera se han servido acusar recibo del material enviado por nosotros; esto nos obliga, muy a pesar nuestro, a verificar algunos cambios en nuestros envíos para que los reciban personas más consecuentes e interesadas. Una vez más vamos a exponer las razones por las cuales colecionamos y publicamos el boletín:

Fomento de las colecciones del Museo Nacional de Ciencias y envío de material a especialistas extranjeros para que nos devuelvan material clasificado que nos pueda servir para comparaciones en nuestros estudios futuros.

Damos cabida en nuestro boletín a las publicaciones de los especialistas extranjeros que estudian nuestros materiales.

Establecer un intercambio de publicaciones que nos permita aumentar nuestra exigua biblioteca entomológica, y para divulgar especialmente temas entomológicos nacionales. Pero damos también cabida a artículos sobre la fauna de otras naciones del continente, con el deseo de acrecentar el acercamiento cultural de los países americanos, porque nuestros problemas entomológicos son iguales, ya en el orden sanitario o en el económico, y es razonable y de mutuo beneficio que nos conozcamos mejor.

Como muchas veces lo hicimos particularmente, de nuevo invitamos a todos los colegas a que nos envíen los trabajos que deseen publicar, y que nos pidan el material de estudio que les pueda interesar. De antemano y cordialmente les brindamos la más amplia colaboración que nuestras posibilidades permitan.

TIPULIDAE NUEVOS O POCO CONOCIDOS DE VENEZUELA

(Diptera)

NEW OR LITTLE-KNOWN TIPULIDAE FROM VENEZUELA

(Diptera)

PART VII

by

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The proceding part under this general title was published in this BOLETIN, vol IV — 30 de junio de 1945, Nº 2. At this time I am continuing the record of species, placing particular stress on the tribe Hexatomini which had been virtually neglected until this part. Most of the new species are from the Maritime Andes of the Estado Aragua, the materials having been secured by my friends, Messrs. Pablo J. Anduze, René Lichy and Gaston Vivas-Berthier, to whom I am indebted for the opportunity of studying the specimens and the privilege of retaining the types in my collection. The present instalment brings the list of species recorded from Venezuela in the present series reports to 127. It is certain that further collecting in very many parts of the republic will result in the discovery of many additional species.

TIPULINAE

(81) *Holorusia* (*Holorusia*) *flavicornis* Alexander.

Hitherto known only from undesignated localities in Venezuela Environs of Chacopo, Merida, altitude 2800 meters August 7, 1942 *(Lichy)*. La Mucuy, Merida, altitude 2500 meters, June 17, 1938 *(Anduze)*; a pair in copula received through Vivas-Berthier. The species is related to *H. (H.) lassula* Alexander, differing especially in the structure of the male hypopygium, particularly the ninth tergite and the outer dististyle.

101. *Holorusia* (*Holorusia*) *infernalis* sp.n

Allied to *plagifera;* general coloration brown, the praescutum and scutal lobes patterned with obscure brownish yellow; basal flagellar segments vaguely bicolored, brown, the extreme bases a trifle more yellow; terminal flagellar segment long, twice the penultimate; femora obscure yellow, the tips narrowly brownish black; wings pale brown, with a conspicuous pattern of darker brown and whitish subhyyaline; the darkest color includes a postarcular band that entirely crosses the wing, involving the bases of cells *Cu* to *2nd A* inclusive; large paired whitish areas in cells *R* and *M*, alternating with major dark brown markings: cell R_3 only moderately constricted beyond midlength, at its narrowest point approximately one-half as wide as it is opposite vein R_2; *cell 1st* M_2 small; abdominal tergites yellowish brown with three diffuse brownish black stripes; cerci yellow, their bases darkened.

Female.— Length about 21 mm.; wing 21.5 mm.

Frontal prolongation of head relatively short, less than the remainder, obscure brownith yellow, more darkened medially above and on sides near apex; nasus black, long and slender, entire; palpi with first segment black, the remainder broken. Antennae with scape obscure yellow beneath, more infuscated above; pedicel obscure yellow; basal flagellar segments very vaguely bicolored, brown, their extreme bases a trifle more yellow, the outer segments uniformly dark brown; terminal segment long, twice the penultimate. Head with front light brown, the vertex much darker brown; anterior vertex narrow, less than three times the diameter of the scape.

Pronotum dark brown. Mesonotal praescutum with four obscure brownish yellow stripes that are delimited by the medium brown ground, the central dark vitta fully one-half as wide as the paler intermediate stripes; suture brownish black, deeply impressed; scutum with median area and about one-half of each lobe adjoining this dark brown, bordered outwardly by obscure yellow, the extreme anterolateral portion of each lobe again darkened; scutellum brown, the parascutella much darker brown; mediotergite brown with three longitudinal darker brown stripes that are about equal in width to the interspaces; pleurotergite chiefly dark brown, the katapleurotergite more heavily so, its anterior callosity obscure yellow. Pleura obscure brownish yellow, the dorsopleural membrane weakly more darkened. Halteres infuscated, the base of stem restrictedly yellow. Legs with the coxae and trochanters obscure yellow; femora and tibiae obscure yellow, the tips rather narrowly brownish black, those of tibiae more narrowly so; tarsi light brown or yellowish brown. Wings conspicuously variegated with pale brown, darker brown and whitish subhyaline; the dark brown color includes a major area at and beyond arculus, completely crossing the wing and involving the bases of both Anal cells; a second dark area crosses both cells *R* and *M* at near one-third the length; a third darkening over the origin of *Rs* ;stigma elongate, dark brown, confluent with a narrow seam over cord; outer end of vein *Cu* and *m-cu* more narrowly bordered with dark brown; very narrow similar seams over the outer end of vein *M* and most of the veins beyond cord, particularly in the radial field; wing-tip in end of cell R_4 restrictedly darkened; the white areas include a large prestigmal one and paired spots in cells *R* and *M*, lying between the dark areas above described, the pale markings narrowly separated from one another by a weak clouding along vein *M;* a slight brightening in base of cell R_2; cells *C* and *Sc* brownish yellow; veins dark brown. Venation: *Rs* long, about two and one-half times m-cu; cell R_3 only moderately constricted beyond midlength, at this point approximately one-half as wide as it is opposite vein R_2; m about two-thirds the petiole of cell M_1; vein M_4 strongly sinuous; cell *1st* M_2 small.

Abdominal tergites yellowish brown, with three diffuse brownish black stripes that are nearly continuous, the lateral

borders of the more proximal segments yellow; sternites yellow, the outer segments slightly more darkened. Ovipositor with the compressed-flattened cerci yellow with darkened bases.

Holotype, ♀, Road between Maracay and Choroni, Aragua, July 25, 1938 (*Vivas-Berthier*).

In its general appearance, this fly is most similar to *Holorusia* (*Holorusia*) *plagifera* Alexander and *H.* (*H.*) *sinuosa* Alexander, differing markedly in details of coloration of the body and wings, and in slight features of venation.

(3) *Holorusia* (*Holorusia*) *plagifera* Alexander.

Rancho Grande, Aragua, altitude 1150 meters, June 24, 1944 *(Lichy)*. This material agrees very closely with the type from the same locality.

102. *Tipula* (*Eumicrotipula*) *tovarensis* sp. n.

Belongs to the *monilifera* group, allied to *mitua;* antennae (male) of moderate length, approximately one-half the length of wing, flagellum black; mesonotal praescutum with four buffy brown stripes, the intermediate pair on cephalic third separated by a capillary black vitta; femora yellow, the tips blackened; wings with a contrasted dark brown, medium brown and whitish subhyaline pattern; male hypopygium with the lobes of tergite not produced at their mesal angles; ninth sternite with appendage suboval, its lower angle with numerous short reddish spinous setae; inner dististyle with modified setae on outer portion of dorsal crest; gonapophyses appearing as flattened blades that are divided into two lobes by a U-shaped apical incision, the outer lobe only moderately produced; appendage of eighth sternite long, approximately two and onehalf times as long as the width at base, provided with abundant setae, those toward the base very long.

Male.— Length about 15 mm.; wing 16.5 mm.; antenna about 8 mm.

Frontal prolongation of head brownish yellow, including the elongate nasus; palpi black. Antennae (male) moderately long, approximately one-half the length of either the wing or body; scape and pedicel yellow; basal flagellar segment

brownish yellow, succeeding segments black, the more proximal ones with the basal knots more intense than the stems; knots of segments abrupt; verticils shorter than the segments; white pubescense long and conspicuous, erect. Head buffy, the front and narrow orbits gray; posterior vertex with a capillary dark brown median vitta; sides of posterior vertex weakly infuscated; vertical tubercle scarcely developed.

Pronotum buffy brown, with three dark brown areas Mesonotal praescutum almost uniform buffy brown, including the four stripes and the almost concolorous interspaces, the latter with relatively few but very conspicuous black setigerous punctures; a median capillary black vitta on cephalic third of praescutum, becoming faint to subobsolete behind; humeral and lateral borders of praescutum with additional darkenings; scutum obscure yellow, infuscated on midline and on the lobes; scutellum infuscated, restrictedly yellow on either side at base; mediotergite more or less infuscated on sides, paler on central portion. Pleura and pleurotergite almost uniform yellow, including the dorsopleural membrane, the latter with a small brown spot behind the spiracle. Halteres brownish black, the base of stem narrowly yellow. Legs with the coxae and trochanters yellow; femora obscure yellow, the tips rather broadly and conspicuously blackened, the amount subequal on all legs; tibiae and basitarsi brown, their tips darker; remainder of tarsi black; claws simple. Wings with a contrasted pattern of medium brown, dark brown and whitish subhyaline, the last relatively restricted, including a narrow post-stigmal band that is narrowed in cell R_5 and barely reaches cell *1st* M_2; other brightennings at end of cell R_5, base of M_1, and in cells *R, M* and *Cu,* the last alternating with more strongly darkened markings; cell *1st A* with a zigzag white mark at near midlength; cells *C* and *Sc* almost uniformly dark brown, sending posterior extensions into cell *R* at arculus, before midlength of cell, at origin of *Rs* and over the anterior cord; outer radial field rather strongly darkened, especially a seam along vein R_{4+5}; veins *Cu* and *m-cu* conspicuously seamed with dark brown; a darker area in cell *1st A* adjoining vein *2nd A* at near midlengh; elsewhere the ground is medium brown, almost uniformly so in the outer medial, cubital and anal fields, including almost all

of cell *2nd A;* veins brown, only a little paler in the costal field. Venation: *Rs* a trifle more than two and one-half times *m-cu;* R_{1+2} straight ,entire; cell *1st* M_2 relatively short and broad; *m* subequal to the petiole of cell M_1.

Abdominal tergites yellow, more or less patterned with pale brown, including very faint median and sublateral stripes, the former more evident near the posterior borders of the segments; basal sternites yellow; subterminal segments forming a broad brownish black ring; outer portions of hypopygium yellow. Male hypopygium (Fig. 1) having the ninth tergite, *9t,* with the entire posterior border broadly emarginate, with a very narrow median split so the lateral lobes are broadly truncated; a small flange on either side of the notch, this not projecting caudad of the posterior border as in many species. Ninth sternite, *9s,* with the appendage suboval, provided with long setae, those of the lower angle shorter, subspinous, reddish in color. Basistyle small, without a clearly developed lobe but with a weak concentration of setae near its lower end. Outer dististyle, *od,* relatively slender, slightly enlarged on its distal half. Inner dististyle, *id,* narrow, the beak relatively stout, obtuse, not heavily blackened; lowerbeak with its outer portion only feebly clerotized, an extension backward more blackened; dorsal crest with a group of modified setae on outher half, these totalling slightly more than twenty; outer portion of style, particularly near base, with dense microscopic setulae. Gonapophyses, *g,* appearing as flattened blades, the posterior margin with a rounded notch that divides the structure into two lobes, the more lateral blade thinner and much larger, but not long-produced as in *mitua.* Eighth sternite, *8s,* with the median lobe long, its length about two and one-half times the width across the base; surface, especially of the proximal two-thirds, with long conspicuous setae, those near apex of lobe unusually small and weak; setae more numerous than in *mitua.*

Holotype, ♂, Ranch Grande, Aragua, altitude 1150 meters, August 24, 1944 (*Lichy*).

The nearest relative of the present fly is *Tipula* (*Eumicrotipula*) *mitua* Alexander (Type: Valle de las Papas, Colombia, altitude 10.000 feet, March 29, 1913, collected by J. T. Lloyd), which differs in slight details of coloration of the

antennae and wings and more evidently in the structure of the male hypopygium, particularly the inner dististyle, gonapophysis and appendage of eighth sternite. The fly is quite distinct from the various members of the *monilifera* group hitherto discovered in Venezuela.

LIMONIINAE

LIMONIINI

103. *Helius* (*Helius*) *rectispina* sp. n.

Belongs to the *albitarsis* group; size medium (wing, male, 7.8 mm.); general coloration brown; antennae short, with very long verticils; legs black, the outer tarsal segments snowy-white; wings with a strong blackish tinge; *r-m* preserved; male hypopygium with the dististyles apical in position, the inner dististyle with a group of spiculose points on lower margin at near midlength; spines of the phallosome unusually long, slender, straight.

Male.— Length about 7 mm.; wing 7.8 mm.

Rostrum and palpi black. Antennae black throughout; flagellar segments oval, with very long verticils, the longest unilaterally distributed, about two and one-half times as long as the segments. Head above black.

Pronotum dark brown, paling to light brown behind and on sides. Mesonotal praescutum almost uniformly dark cinnamon brown, the lateral borders and the scutal lobes darker; median region of suture and center of scutum obscure yellow; scutellum more testaceous brown; postnotum darker brown, the suture bordered by obscure yellow. Pleura light brown, the posterior sclerites darker brown, especially a spot on the dorsal anepisternum before the wing-root; dorsopleural membrane dusky. Halteres blackened. Legs with the coxae and trochanters yellowish brown; remainder of legs black, the terminal segments of tarsi snowy-white, involving the distal third of the basistyle and the succeeding segments; claws simple. Wings with a strong blackish tinge, the costal border and seams along veins *Cu* and *2nd A* still darker; stigma oval, darker than the ground; veins dark brown. Venation: *r-m*

short to very short but preserved; m-cu at near three-fifths the lower face of cell *1st M*, the latter a little shorter than vein M_4.

Abdomen dark brown, more blackened laterally and on hypopygium. Male hypopygium (Fig. 2) with mesal face of basistyle, *b*, provided with abundant elongate setae but without lobes. Dististyles apical in position; outer dististyle, *od*, glabrous, relatively small, the axial spine much longer than the subterminal outer one. Inner dististyle, *id*, about one-third longer than the outer, only gently curved, the distal third narrowed and pale, slightly dilated at outer end; lower margin of style at near midlength with a small group of spiculose points or pegs. Phallosome, *p*, united into a common median plate, from the outer angles of which rise the gonapophyses, these unusually long and slender, especially the apical portion which is only a little less than twice the length of the outer dististyle; basal portion of apophysis stouter, bent, strongly cephalad, the long terminal spine directed caudad. Aedeagus, *a*, strongly coiled on its outer portion subtended by pale membrane.

Holotype, ♂, Rancho Grande, Aragua, altitude 1150 meters, August 27, 1944 (*Lichy*).

Helius (*Helius*) *rectispina* is most similar to other black-winged species of the *albitarsis* group, such as *H. (H). capniopterus* Alexander, of southeastern Brazil. It differs especially in the structure of the male hypopygium, particularly the inner dististyle and the phallosome, such as the elongate spines of the gonapophyses. These latter structures have been variously homologized or interpreted as representing lateral spines of the tergite or as being interbases. In the present species they clearly rise from a median phallosomic plate and are interpreted as being gonapophyses. Whatever their true homologies prove to be, they represent a single structure throughout the genus and one that provides unusually important characters in defining the host of species in the genus *Helius*.

HEXATOMINI

104. *Austrolimnophila (Austrolimnophila) vivas-berthieri* Alexander.

1938. *Austrolimnophila vivas-berthieri* Alexander; Rev. de Entomologia, 9: 436 - 437.

Rancho Grande, Aragua, altitude 1100 meters, September 5, 1937 (*Vivas-Berthier*).

105. *Epiphragma (Epiphragma) histrio* Schiner.

1868. *Epiphragma histrio* Schiner; Novara Reise, Diptera, p. 41.

Like so many other species of Diptera in the "Novara Reise", the type locality of the present fly was cited by Schiner as "Columbien" Through the kindness of Dr. Hans Zerny of the Vienna Museum, I was able to examine this and other Schiner types and find that the present species was taken in Venezuela by Alexander Lindig in 1864. Since the species is still poorly known, I am supplying some further notes on the type specimen made in April 1921.

Type, a male, in good condition except that all legs are broken at the trochanters.

Male.— Length about 8 mm.; wing 11 mm.

Rostrum and palpi dark brown. Antennae of moderate length only; scape, pedicel and first segment of flagellum dark brown, remaining flagellar segments obscure yellow. Head brown.

Pronotum and about the anterior half of mesonotal praescutum dark brown, this color continued along the lateral margins of praescutum almost to the suture; remainder of mesonotum, excepting the pleurotergite, pale buffy brown. Pleura and pleurotergite dark brown, being a posterior extension of the anterior mesonotal darkening. Halteres yellow. Legs with fore coxae dark brown, the tips narrowly yellow; middle and hind coxae with approximately the basal half dark brown, the distal portion yellow; all trochanters light yellow; remainder of legs broken. Wings strongly yellow, with a very pale brown ocelliform pattern, the centers of such eye-like markings being the arculus, origin of *Rs*, anterior cord and the tip of R_{1+2}; small brown clouds at the ends of the longitudinal veins; a series of about three linear brown marks in the end of cell *1st A* and five or six similar dashes

in the end of cell *2nd A;* a series of seven or eight parallel brown marks in cell *Cu* behind vein *Cu;* cord, outer end of cell *1st* M_2 and the fork of M_{1+2} narrowly seamed with brown; veins brown. Venation: Supernumerary crossvein in cell *C* a little before midlength of the distance between the origin of *Rs* and tip of Sc_1; Sc_2 a little longer than Sc_1 close to tip of latter; R_2 a little shorter than R_{1+2}; R_{2+3} a little longer than R_3; R_{2+3+4} a little longer than *m-cu;* Rs long, angulated and spurred at origin; inner ends of cell R_4, R_5 and *1st* M_2 about in transverse alignment; cell *1st* M_2 narrowed at base, widened distally; petiole of cell M_1, about as long as *m-cu,* the latter far out toward the end of cell *1st* M_2, at approximately five-sixths the length of cell; anterior arculus lacking.

Abdomen obscure brownish yellow, including the hypopygium.

I have a photograph of the wing of the type in my personal notebooks concerning the Tipulidae.

106. *Epiphragma* (*Epiphragma*) *inaequicincta* Alexander.

1941 *Epiphragma (Ephiphragma) inaequicincta* Alexander; Rev. de Entomología, 12: 331 - 332.

Choroni, Aragua, November 1940 (*Lichy*). Formerly from Costa Rica and Panama.

107. *Epiphragma* (*Epiphragma*) *persancta* Alexander.

1938. *Epiphragma* (*Epiphragma*) *persancta* Alexander; Rev. de Entomologia, 9: 248 - 249.

Rancho Grande, Aragua, altitude 1100 meters, September 5, 1937 (*Vivas-Berthier*).

108. *Epiphragma* (*Epiphragma*) *solatrix* (Osten Sacken).

1859. *Limnophila* (*Epiphragma*) *solatrix* Osten Sacken; Proc. Acad. Nat. Sci. Philadelphia 1859: 238.

Rancho Grande, Aragua, altitude 1100 meters, August 29, 1937 (*Vivas-Berthier*).

109. *Epiphragma* (*Epiphragma*) *varia* (Wiedemann).

1828. *Limnobia varia* Wiedemann; Aussereur. zweifl. Ins., 1: 573.

San Esteban, Carabobo, January 1, 1940 (*Anduze*). A very distintict fly with a great range throughout Tropical America.

110. *Polymera* (*Polymera*) *niveitarsis* Alexander.

1913. *Polymera niveitarsis* Alexander; Proc. U. S. Nat. Mus., 44: 532-533.

Yaracuy, March 12, 1920 *(E. B. and J. H. Williamson; W. H. Ditzler)*. Caño del Tigre, Mérida, September 1943 *(Anduze)*. San Esteban, Carabobo, December 19, 1939 (*Anduze*). Wide-spread in Central and northern South America.

111. *Polymera* (*Polymera*) *subsuperba* Alexander.

1926. *Polymera* (*Polymera*) *subsuperba* Alexander; Ann. Ent. Soc. America, 19: 382.

Santa Elena, Bolivar, altitude 900 meters, October 19, 1940 (*Anduze*). Hitherto known only from Paraguay. Although it is obviously allied to the common and wide-spread *P.* (*P.*) *superba* Alexander, the present fly seems to be specifically distinct rather than representing a subspecies.

112. *Limnophila dictyoptera* Alexander.

1922. *Limnophila dictyoptera* Alexander; Proc. U. S. Nat. Mus., 60, Art. 25: 5.

Tabay, Merida, altitude 1760 meters, September 1942 *(Anduze)*. Formerly known from Central America. There are several closely related species or subspecies in Tropical America that require material and study before their true interrelations are known.

113. *Limnophila kaieturana* Alexander.

1930. *Limnophila kaieturana* Alexander; Ann. Ent. Soc. America, 23: 733.

1931. *Linophila kaieturana* Alexander; Amer. Mus. Nov., 491: 12.
Mt. Duida, November 28, 1928 *(G. H. H. Tate)*.

114. *Limnophila roraima* Alexander.

1931. *Limnophila roraima* Alexander; Amer. Mus. Nov., 491: 13.

Mt. Roraima, summit, altitude 8600 feet, November 1927 (*G. H. H. Tate*).

115. *Limnophila roraimicola* Alexander.

1931. *Limnophila roraimicola* Alexander; Amer. Mus. Nov. 491: 13-14.

Mt. Roraima, summit, altitude 8600 feet, November 1927 (*G. H. H. Tate*).

116. *Limnophila (Roraimomyia) permonstrata* Alexander.

1935. *Limnophila (Roraimomyia) permonstrata* Alexander; Ann. Ent. Soc. America, 28: 323 - 324.
Mt. Roraima, sumit, altitude 8500 feet, November 20, 1932 (*Myers*).

"Running very actively over the ground, in the lower places, especially sandy spots near the lagoons. Not uncommon, but patchy in distribution". — John G. Myers notes, Nº 3269. This is one of the most interesting crane-flies ever discovered. It is the only species in the entire world that has lost both the wings and the halteres, yet, from a study of the mal hypopygium, it is obviously allied to normal species in the genus *Limnophila* and it was deemed necessary to propose only a new subgenus, *Roraimomyia* Alexander (l.c), for its reception.

117. *Shannonomyia araguae* sp. n.

General coloration of thorax light brown, the praescutum with three darker brown stripes; antennae (male) moderately long, the lower face of each flagellar segment protuberant; legs yellowish brown, the outer tarsal segments blackened; wings with a brownish tinge; cells beyond cord with abundant long macrotrichia; Sc_1 ending opposite fork of *Rs;* R_2 beyond fork of R_{2+3+4}, subequal to R_{1+2} or R_{2+3}; cell *1st* M_2 closed; male hypopygium with gonapophyses unusually long and slender.

Male. — Length about 5 mm.; wing 5.4 mm.; antenna about 2 mm.

Rostrum and palpi black. Antennae with the scape and pedicel brown, flagellum black; antennae relatively long, as shown by the measurements; flagellar segments elongate-suboval, with the ventral face bulging and provided with very short verticils; on the outer face of each segment a single elongate verticil that is nearly as long as the segment; surface of segments with a dense erect pale pubescence; terminal segment about one-half as long as the penultimate. Head dark brownish gray, slightly paler in front, in certain lights apparantly with a more blackish ground; anterior vertex nearly three times the diameter of the scape.

Prothorax and mesothorax chiefly light brown, the praescutum with three darker brown stripes, the centers of the scutal lobes similarly darkened. Pleura and postnotum paler brown to testaceous, the surface sparsely pruinose. Halteres weakly infuscated. Legs with the coxae testaceous yellow; trochanters yellow; remainder of legs pale yellowish brown, the outer tarsal segments blackened. Wings (Fig. 3) with a brownish tinge, the small stigma a trifle darker; veins and macrotrichia darker brown. Cells of wing beyond cord with abundant macrotrichia, these restricted to the centers of the cells, basad of cord including the outer ends of cells *R, M, Cu* and *1st A* (in figure, their postition indicated by stippling). Venation: Sc_1 ending opposite fork of Rs, Sc_2 near its tip; *Rs* relatively long, arcuated at origin; R_{2+3+4} about one-half *Rs*, very gently arcuated; R_2 very faint, evidently placed at near midlength of stigma and subequal to R_{1+2} or R_{2+3}; elements of cord in transverse alignment, *r-m* more arcuated; cell *1st* M_2 relativley narrow, subequal in length to vein M_4 beyond it, *m-cu* opposite midlength of cell; vein *2nd A* gently sinuous.

Abdomen brownish black, the hypopygium a trifle paler. Male hypopygium (Fig. 4) with the mesal face of basistyle, *b*, provided with unusually abundant and coarse yellow setae. Outer dististyle, *od*, dilated on basal two-thirds or more and here provided with unusually long setae, the apex narrowed, blackened, bidentate; inner dististyle, *id*, with its distal half narrowed and gently arcuated. Gonapophyses, *g*, unusually

long and slender, the base a flattened plate, the elongate arm very strongly curved to the acute tip, at base with a smaller point, separated from the arm by a linear notch. Aedeagus, *a*, expanded at base.

Holotype, ♂, Rancho Grande, Aragua, altitude 1150 meters, August 24, 1944 (*Lichy*).

Shannonomyia araguae is entirely distinct from other described members of the genus. The other species having macrotrichia in the wing cells, including *S. myersiana* Alexander, of Jamaica, and *S. olssoni* (Alexander), of Central America, have the male antennae much more elongate and differently constructed, and with the details of venation quite distinct.

118. *Shannonomyia roraimensis* Alexander.

1935. *Shannonomyia roraimensis* Alexander; Ann. Ent. Soc. America, 28: 324-325.

Mt. Roraima, summit, altitude 8500 feet, November 1932 (*D. Vesey-FitzGerald*).

119. *Atarba* (*Ischnothrix*) *brevisector* (Alexander).

1935. *Ischnothrix brevisector* Alexander; Ann. Ent. Soc. America, 28: 326-327.

Silla de Caracas, in cloud forest, altitude 1900 meters, December 21, 1930 *(J. G. Myers)*.

120. *Atarba* (*Atarba*) *unilateralis* Alexander.

1931. *Atarba* (*Atarba*) *unilateralis* Alexander; Amer. Mus. Nov. 491: 14-15.

Mt. Duida, December 28, 1928 (*G. H. H. Tate*).

121. *Lecteria* (*Psaronius*) *pygmaeus* (Alexander).

1914. *Psaronius pygmaeus* Alexander; Trans. Amer. Ent. Soc., 40: 249-250.

Amakuro River, February 1931 *(J. G. Myers)*; Nº 1740.

Formerly known from British Guiana and Brazil.

122. *Hexatoma* (*Eriocera*) *latissima* (Alexander).

1868. *Eriocera erythrocephala* Schiner, nec Fabricius; Novara Reise, Diptera, p. 41.

1922. *Eriocera latissima* Alexander; Trans. Ent. Soc. London, 1922: 55 - 56.

The species was described from the "Novara" materials in the Vienna Museum, the specimens collected in Venezuela, without more exact data, by Alexander Lindig in 1864. The material had been mis-determined by Schiner as being *Eriocera erythrocephala* (Fabricius), a different species, now known as *Hexatoma* (*Eriocera*) *longistyla* Alexander 1913.

123. *Hexatoma (Eriocera) longipennis* (Alexander).

1923. *Eriocera longipennis* Alexander; Ent. News, 34:17. Macuto, Jan. 29, 1920 (E. B. & J. H. Williamson; W. H. Ditzler).

124. *Hexatoma* (*Eriocera*) *neosaga* sp.n.

Allied to *saga;* mesonotal praescutum polished black with a pruinose area on lateral margin behind the pseudosutural foveae; vertical tubercle very high, deep orange, restricting the remaining black coloration of head, the tubercle divided into two halves by a median furrow; femora black, the fore pair with an obscure yellow subbsal ring; wings with a strong brownish tinge, the prearcular field, costal border and stigma still more blackened; veins unusually glabrous; abdomen black, the basal tergal rings more polished and slightly nacreous; ovipositor with genital shield and cerci blackened.

Female.— Length about 19 mm.; wing 12.2 mm.; antenna about 3.5 mm.; abdomen alone 14 mm.

Rostrum brown; mouthparts and palpi black. Antennae (female) 11-segmented; scape black, obscure brownish yellow beneath; remainder of organ black; first flagellar segment longer than segments two and three taken together; outer

flagellar segments progressively shorter, the penultimate and antepenultimate subequal, a trifle shorter than the last. Head black beneath, on front and on sides of posterior vertex, the entire anterior vertex and most of the posterior vertex very strongly protuberant, fiery orange; vertical tubercle divided into halves by a median furrow, each half further elevated into a small papilla.

Pronotum brownish black, gray pruinose. Mesonotal praescutum polished black, with a pruinose area on lateral margin behind the pseudosutural fovea; posterior sclerites of notum chiefly obscured by a brownish gray pruinosity, the cephalic portion of scutal lobes polished black. Pleura and pleurotergite chiefly gray pruinose over a blackened ground, the posterior portions of the pleurotergite and ventral anepisternum more denuded; dorsopleural membrane dark. Halteres with stem brownish black, the knob more blackened. Legs with coxae black, sparsely gray pruinose; trochanters black, with some reddish tints on lower faces; all femora black, the fore pair with a narrow, obscure yellow ring about one-half its own length beyond the base; tibiae and tarsi a trifle paler, brownish black. Wings (Fig. 5) with a strong brownish tinge, the prearcular field, cells *C* and *Sc*, and the small stigma still more blackened; narrow dark seams along cord and in cell *M* adjoining vein *Cu;* veins dark brown. Veins unusually glabrous, beyond cord and excepting R_1, with a sparse series over the entire length of distal section of vein R_5. Venation: Sc_1 ending about opposite two-fifths the length of R_{2+3+4}, Sc_2 at near one-fifth this length; R_2 a trifle shorter than R_{1+2} and nearly twice R_{2+3}; cell *1st* M_2 longer than the distal section of vein M_3; *m-cu* slightly more than one-third its length beyond the fork of *M*, slightly exceeding in length the distal section of Cu_1.

Abdomen black, without yellow color, the basal tergal rings more polished and slightly more nacreous than the re-

mainder. Ovipositor with the genital shield and the cerci black, the latter moderately long, straight.

Holotype, ♂, San Esteban, Carabobo, December 29, 1939 (*Anduze*).

The most nearly related regional species is *Hexatoma* (*Eriocera*) *saga* Alexander, q.v. This latter, while generally similar to the present fly, differs in many details of coloration of the body, legs and wings, especially the small vertical tubercle, clearer wings, and the conspicuous yellow rings on the abdomen.

125. *Hexatoma* (*Eriocera*) *saga* Alexander.

1940. *Hexatoma* (*Eriocera*) *saga* Alexander; Rev. de Entomologia, 11: 900-902.

The type was from the Quebrada de las Avispas, Trujillo, altitude 1950 meters, collected June 7, 1938 by Anduze, sent to me by Vivas-Berthier.

126. *Hexatoma* (*Eriocera*) *schineri* (Alexander).

1868. *Penthoptera fuliginosa* Schiner; Novara Reise, Diptera, p. 42 (preoccupied).

1922. *Eriocera schineri* Alexander; Trans. Ent. Soc. London, 1922: 60-61.

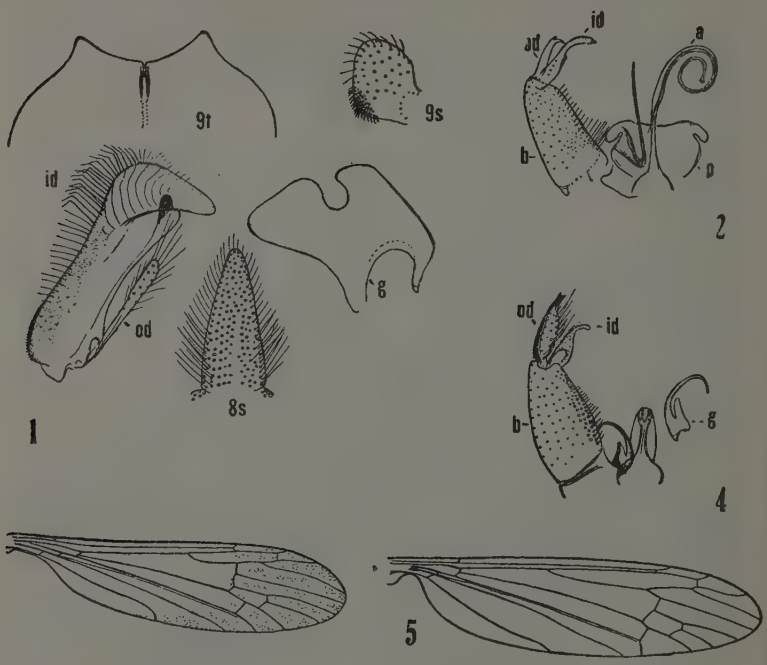
The type was based on material collected in Venezuela, without more exact data, by Alexander Lindig in 1864.

127. *Hexatoma* (*Eriocera*) *semirufa* (Alexander).

1923. *Eriocera dimidiata* Alexander; Ent. News, 34: 17-18 (preoccupied).

1927. *Eriocera semirufa* Alexander; Journ. N. Y. Ent. Soc., 35: 273.

The types were from Tachira, E. Tachira, April 4-11, 1920 (E. B. & J. H. Williamson; W. H. Ditzler).



EXPLANATION OF FIGURES

Fig. 1.— *Tipula* (*Eumicrotipula*) *tovarensis* sp.n; male hypopygium.
Fig. 2.— *Helius* (*Helius*) *rectispina* sp.n.; male hypopygium.
Fig. 3.— *Shannonomyia araguae* sp.n.; venation.
Fig. 4.— *Shannonomyia araguae* sp.n.; male hypopygium.
Fig. 5.— *Hexatoma* (*Eriocera*) *neosaga* sp.n.; venation.

(Symbols: *a*, aedeagus; *b*, basistyle; *g*, gonapophysis; *id*, inner dististyle; *od*, outer dististyle; *p*, phallosome; *s*, sternite; *t*, tergite).

Corrigenda

A typographical error in Part VI of this series of papers (Bol. Ent. Venezolana, 4: 75-77; June 1945) should be corrected. This pertains to *Tipula* (*Eumicrotipula*) *infinita*, where, on page 75 and the first three lines on page 76 there is found the description of the thorax and its appendages. This entire page belongs on page 77, immediately before the paragraph that begins "Abdominal tergites, etc.".

PART VIII

The intial part of this series of papero was published in the BOLETIN DE ENTOMOLOGIA VENEZOLANA, vol. 2: 17 - 26; March 1943; the immediately preceding number, Part VII, precedes this chapter.

In the present report I wish to complete the basic list for Venezuela by recording the numerous published and unpublished data, placing particular stress on the concluding tribe, the vast group of small and obscure types constituting the Eriopterini. This paper brings the total list to date to 160 species. As before, I express my deepest thanks and appreciation to Messrs. Pablo J. Anduze, René Lichy and Gaston Vivas-Berthier for their continued interest in saving these fragile flies and for permitting me to retain the novelties in my own collection.

Historical Development of our Knowledge of Venezuelan Tipulidae.

Apparently the first of the great naturalists to visit Venezuela, including Alexander von Humboldt (1799 - 1800), collected no specimens of Tipulidae. Near the middle of the Ninteenth Century, Macquart and Rondani described a very few species of crane-flies but gave no indication of the source of their materials. The earliest series of importance is contained in the Vienna Museum, having been donated by Carl Gotthelf Kaden, collected in August 1857, without more exact locality data (labelled only "Alte Sammlung") A second and more important series was taken by Alexander Lindig in 1864 and furnished the basis for many of the crane-fly records given by Schiner in his report on the Diptera of the "Novara Reise", 1868. As has been indicated in earlier parts of the present series of papers, for some unknown reason Schiner persisted in recording all such Venezuelan materials as having come from Colombia, despite the independence of Venezuela in 1829.

There followed a period of approximately half a century when apparently no materials in this family were secured in Venezuela. In April 1920, Messrs. E. B. and J. H. Williamson, with W. H. Ditzler, specializing in the Odonata, visited extreme western Venezuela, particularly the Estado Tachira.

They collected small series of insects in other groups for their various entomological friends, the Tipulidae being presented to the author of this report. About 1930 and thereaft Dr. John G. Myers, then stationed at the Imperial College of Tropical Agriculture in Trinidad, made collections of plants and insects on the Silla de Caracas, along the Orinoco, and later on Mount Roraima, as discussed below.

Mount Roraima. This most fascinating of mountains apparently was first visited by an entomologist when Mr. G. H. H. Tate, of the staff of the American Museum of Natural History, New York City, spent some time (November 1927) on the mountain, specializing in the collecting of birds and mammals, but securing a number of insects, including some very interesting Tipulidae. (1) The following year (November-December 1928) somewhant comparable studies were made on Mount Duida, nearly three hundred miles to the westward. In November 1932, Dr. Myers, with his asistant, Mr. D. Vesey-FitzGerald, while engaged in a project to introduce the Amazon Fly (*Metagonistylum minense* Towns.) into the cane fields of British Guiana, took the time and opportunity to make a rapid ascent of Roraima. From his manuscript notes on the Tipulidae, it appears that the approach to the mountain, via Arabopo, was made between November 14th and 19th, and that the party was on the actual summit of Roraima on November 20th and 21st. Dr. Myers and Mr. FitzGerald collected a small series of Tipulidae and it is of interest to note that virtually every one of these was distinct from any of those taken exactly five years before by Tate. This would seem to indicate that the crane-fly fauna of the summit of Roraima is relatively rich and that still further interesting discoveries may be expected in the future. The confusion concerning the exact geographical status of Roraima, where birds, plants and insects from the summit have been variously ascribed to British Guiana, Brazil and Venezuela, has been clarified most ably by Phelps (2) who has shown definitely

(1) Tate, G.H.H. Through Brazil to the summit of Mount Roraima. Nat. Geog. Mag., 58: 585 - 605; November 1930.

(2) Phelps, William H. The geographical status of the birds collected at Mount Roraima. Bol. Soc. Venezolana de Cien. Nat., 36: 83-95, 6 maps.; 1939.

that all such summit collections on Roraima must of necessity have been made in Venezuela.

In still more recent years, a few specimens of Tipulidae have been taken by Mr. Axel Olsson, a petroleum geologist. By far our greatest advance in Venezuelan entomology, including the Tipulidae, is due to the recent and present work of the most capable and energetic group of men centering about Mr. Pablo J. Anduze, including, as regards the Tipulidae, also Messrs. Gaston Vivas-Berthier and René Lichy. The founding of the "Boletin" has proven a vast stimulus to the further development of our knowledge of the almost limitless insect fauna of this great republic.

LIMONIINAE
LIMONIINI

128. *Limonia* (*Limonia*) *apicata* (Alexander).

1914. *Dicranomyia apicata* Alexander; Trans. Amer. Ent. Soc., 40: 225-226.

San Camilo, E. Tachira, October 1944 (*Anduze*).

129. *Limonia* (*Dicranomyia*) *capra* sp.n.

Allied to *brevivena;* general coloration gray, the praescutum and scutum conspicuously patterned with dark brown; rostrum brownish black, in cases a little brightened at base; antennae black throughout; thoracic pleura more or less patterned with brown, including a short stripe on the propleura; knobs of halteres infuscated; wings whitish subhyaline, with a distinct brown stigmal area; cell *1st.* M_2 closed; male hypopygium with the caudal margin of the tergite nearly truncate, the lobes very low; ventral dististyle large and fleshy, as compared with related species.

Male.— Length about 4.5 - 4.8 mm.; wing 5.2 - 5.8 mm.
Female.— Length about 5.5 - 5.8 mm.; wing 5.5 - 6 mm.

Rostrum brownish black, in cases obscure brownish yellow at base above; palpi black. Antennae black throughout; basal flagellar segments short-oval, the outer ones passing

into long-oval. Head dark gray; anterior vertex (male) moderately wide, a little less than twice the diameter of scape, in female a trifle wider.

Pronotum brown, more or less pruinose. Mesonotal praescutum with the ground gray, obscure brownish gray on the interspaces, yellowish gray on the humeral region, clearer gray on lateral borders; three conspicuous brownish black praescutal stripes, the broad median one not reaching the suture behind; lateral stripes somewat narrower, crossing the suture and extensively suffusing the scutal lobes; median region of scutum broadly obscure yellow, the posterior and lateral margins of the lobes similarly pale; scutellum and mediotergite brownish black, sparsely pruinose. Pleura and pleurotergite yellow, sparsely pruinose, with small darkenings, including a short dark brown stripe from the cervical region across the propleura; paler areas on ventral anepisternum and sternopleurite. Halteres with stem whitened, knob infuscated. Legs with fore coxae infuscated, remaining coxae and all trochanters yellow; remainder of legs pale brown; claws (male) with a single well-developed tooth. Wings (Fig. 1) whitish subhyaline, the prearcular field pale yellow; stigma short-oval, medium brown; veins brown, those at base more yellowed. Venation: Sc_1 ending some distance before origin of *Rs*, the distance varying from about one-half to two-thirds the length of *Rs*; Sc_2 far from the tip of Sc_1, the latter vein alone subequal to *Rs*; *Rs* and basal section R_{4+5} subequal in length, both gently arcuated; cell *1st* M_2 normally closed, nearly as long as the distal section of M_{1+2} *m-cu* close to fork of *M*, in cases just before or beyond this point.

Abdominal tergites brownish black, the caudal margins of the segments narrowly paler, sternites more yellowed; hypopygium chiefly pale, basistyle darkened. Ovipositor with cerci small, slender, gently upcurved. Male hypopygium (Fig. 5) with the tergite, *9t*, transverse, its caudal margin nearly truncate, with the lateral lobes barely indicated by thickened margins that bear long conspicuous setae. Basistyle, *b*, with the ventromesal lobe long simple. Dorsal dististyle a curved yellow rod, very gradually narrowed to the long tip. Ventral dististyle, *vd*, large and fleshy, as compared with the related

species, the rostral prolongation and its spines of the goat-like type of *brevivena* and allied species. Gonapophysis, *g*, with mesal-apical lobe strongly curved, its tip acute. A paratype has the rostral prolongation even stouter and with a median group of four or five setae on the tergite back from the margin.

Holotype, ♂, Rancho Grande, Aragua, altitude 1150 meters, August 27, 1944 (*Lichy*). *Allotype*, ♀, Rio Chacaito, Miranda, altitude 980 meters, September 18, 1938 (*Vivas-Berthier*). *Paratypes*, 1 ♀, with the allotype; 6 ♂ ♀, Los Canales, Naiguata, D. F., altitude 720 meters, September 24, 1938 (*Vivas-Berthier*).

The present fly is told from various allies by the normally closed cell *1st* M_2 distinct stigmal spot, blakened rostrum, and the details of the hypopygium, especially the tergite and ventral dististyle. There are several spiecies that have the male hypopygium rather similar, these including *Limonia (Dicranomyia) brevivena* (Osten Sacken), *L. (D.) floridana* (Osten Sacken) and *L. (D.) rostrifera* (Osten Sacken) in the Nearctic fauna. A subspecies of *brevivena, torrida* Alexander, inhabits the Greater Antilles. I consider the present fly as being clossest to *floridana* which has been reported by Rogers as having a marine larva, implying a coastal distribution. In Patagonia, still another species, *L. (D.) ambigua* Alexander is found. Until more data are available, there is no alternative but to consider these flies as representing distinct species having a generally similar type of hypopygium.

130. *Limonia (Dicronomyia) distans* (Osten Sacken).

1859. *Dicranomyia distans* Osten Sacken; Proc. Acad. Nat. Sci. Philadelphia 1859; 211.

1914. *Dicranomyia parishi* Alexander; Trans. Amer. Ent. Soc. 40: 226-227.

1925. *Dicranomyia tricornis* Alexander; Ann. Ent. Soc. America 18: 344-345.

Laguna de Tacarigua, Miranda, at sea-level, August 17, 1938 *(Lichy)*. The species has a vast range over North and South America, chiefly coastel or at low altitudes.

131. *Limonia (Dicranomyia) subandicola* sp.n.

Generally similar to *andicola;* mesonotal praescutum greenish yellow, with three black stripes; posterior sclerites of notum and the pleura chiefly blakened; femora obscure yellow, the tips abruptly pale yellow, preced by a darker ring; wings with a yellowish ground, sparsely patterned with brown, including a continuous seam the entire length of vein *Cu;* male hypopygium with the basistyle bearing a small setiferous tubercle on mesal face near apex; gonapophysis with mesal-apical lobe expanded into a flattened blade, its tip broadly obtuse, the surface with abundant microscopic tubercles.

Male.—Length about 8-9 mm.; wing 8-10 mm.

Female.—Length about 8 mm.; wing 8 mm.

Rostrum and palpi black. Antennae black throughout, scape silightly pruinose; flagellar segments oval, the outer ones more slender and slightly more elongate. Head dark brown, gray pruinose; anterior vertex (male) narrow, not exceeding the diameter of the scape.

Pronotum dark brown above, paling to yellow on the sides. Mesonotal praescutum with the ground obscure greenish yellow, the surface chiefly covered by three black stripes; posterior interspaces more reddened; scutum obscure yellow, the lobes chiefly blackened; scutellum brown with a whitish central area; mediotergite infuscated, especially behind, somewhat paler in front; pleurotergite chiefly greenish yellow. Pleura extensively blackened on the propleura and messepisternum. Halteres with stem yellow, knob infuscated. Legs with the coxae greenish yellow, the fore pair darkened; trochanters greenish; femora obscure yellow, the tips conspicuously pale yellow, preceded by a subequal dark brown ring; tibiae obscure yellow, the tips narrowly infuscated; tarsi passing into dark brown. Wings with a yellowish tinge, the prearcular and costal fields clearer yellow; a restricted brown pattern, including the oval stigma and a large confluent cloud over the anterior cord; posterior cord and outer end of cell *1st* M_2 more narrowly seamed with brown; a conspicuos brown seam extending the entire length of vein *Cu,* occupying cell Cu_1 and a space of comparable width in cells *M* and M_4, this

stripe not broadly interrupted before *m-cu* as in *andicola;* veins brownish yellow, somewhat darker in the patterned fields. Venation: Sc_1 ending approximately opposite origin of *Rs,* Sc_2 a short distance from its tip so Sc_1 alone is about one-fourth *Rs;* cell *1st* M_2 nearly as long as the distal section of M_{1+2}; *m-cu* at or close to the fork of *M.*

Abdominal segments, especially the tergites, conspicuously dimidiate, black, with broad yellow apical rings, on the sternites these subequal in extent but somewhat more obscure; subterminal segments, especially the sternites, more uniformly blackened to form a subterminal ring; hypopigium brown the ventral dististyles obscure yellow. Male hypopygium (Fig. 6) with the tergite *9t,* transverse the caudal margin with a broad V-shaped notch, the elongate setae chiefly marginal in distribution. Basistyle, *b,* with the ventromesal lobe unusually basal in position, simple; on mesal face of style near apex with a low tubercle that is provided with a group of about a dozen strong setae. Dorsal dististyle very small but slender, strongly curved and gradually narrowed. Ventral dististyle, *vd,* very large and fleshy, its area approvimately four times that of the basistyle; rostral prolongation very small, the two spines longer than the prolongation, placed close together; apex of prolongation with a row of four or five strong pale flattened setae, their tips bent strongly caudad. Gonapophysis, *g,* with the mesal-apical lobe appearing as a flattened blade, the tip obtusely rounded; basal portion of the head or expanded area abruptly truncated and microscopically toothed; surface of blade with abundant microscopic tubercles, the outermost somewhat smaller.

Holotype, ♂, El Junquito, D.F., altitude 1780 meters, January 3, 1938 *(Vivas-Berthier);* Collector's Nº 7. *Allotopotype,* ♀, pinned with type. *Paratopotypes,* 4 ♂♂, with type; *paratypes,* 1 ♂, Road Maracay to Choroni, kilm. 16,500, January 14, 1939 *(Lichy);* 1 ♂, Almaguer, Colombia, altitude 10,500 feet, March 11, 1912 *(J. T. Lloyd),* previously recorded (Alexander 1913) as *andicola;* 1 ♂, Piedras Grandes, Huanuco, Peru, altitude 3,000 meters, November 15, 1937 *(Woytkowski).*

There are now known several generally similar species of *Dicranomyia* in the Andean region that differ conspicuously from one another in the structure of the male hypopygium, particularly the gonapophyses. The present fly is clossest to *Limonia (Dicranomyia) andicola* (Alexander 1912), which is still known only in the female sex. This differs in the pattern of the body and wings, as compared above.

132. *Limonia (Rhipidia) annulicornis* (Enderlein).

1912. *Rhipidia annulicornis* Enderlein; Zool., Jahrb., Syst., 32: 80-81.

San Esteban, Carabobo, December 26, 1939 *(Anduze)*.

133. *Limonia (Rhipidia) domestica* (Osten Sacken).

1859. *Rhipidia domestica* Osten Sacken; Proc. Acad. Nat. Sci. Philadelphia, 1859: 208.

San Esteban, Carabobo, December 19, 1939 *(Anduze);* Rio Chacaito, Miranda, altitude 980 meters, September 18, 1938 *(Vivas-Berthier)*. The male of the San Esteban material has four rostral spines, whereas three is the common number for the typical subspecies. The species is wide-spread in the temperate and tropical regions of the New World, apparently breaking into various geographical races, some of which have been defined and named.

134. *Limonia (Rhipidia) flabelliformis* Alexander.

1934. *Limonia (Rhipidia) flabelliformis* Alexander; Ann. Ent. Soc. America, 27: 59-60.

El Junquito, D.F., altitude 1780 meters, January 3, 1938 *(Vivas-Berthier)*.

135. *Limonia (Rhipidia) paulus* sp.n.

Allied to *bruchiana;* size relatively small (wing, male, 6 mm.); abdomen elongate; antennae (male) with flagellar segments longbipectinate; thorax with a broad pale yellow lateral stripe, the dark color of the notum restricted to a median praescutal stripe and darkenings on the scutal lobes, the scutellum uniformly yellow; pleura chiefly dark brown, deepening to black along its dorsal edge; femora weakly infuscated, the tips narrowly yellow; posterior tarsi not of different pattern from the other legs; wings with a grayish

tinge, patterned with darker brown and whitish subhyaline areas, the former including five major costal markings; abdominal tergites uniformly brownish black; male hypopygium with the tergite unusually narrow; rostral prolongation of ventral dististyle very slender, its outer margin with a high pale flange; gonapophysis with mesal-apical lobe stout.

Male.—Length about 8.5 mm.; wing 6 mm.; abdomen alone about 6.2 mm.

Rostrum and palpi black. Antennae with scape and pedicel black; basal two flagellar segments uniformly blackened, the succeeding ones strongly bicolored, the basal swelling and branches black, the elongate stem whitened; antennae broken beyond the ninth segment; flagellar segments long-bipectinate, the longest branches about one-half to two-thirds longer than the segment. Head gray with a blackened median spot on posterior vertex; head broadly holoptic, the anterior vertex obliterated over a long extent, the eyes correspondingly large and conspicuous.

Pronotum dark brown. Messonotum with sides of praescutum, scutal lobes, scutellum, dorsal pleurotergite and lateral borders of mediotergite pale yellow, together with the extreme dorsal portion of the pteropleurite, to form a broad dorsolateral stripe, somewhat as in the *subpectinata* group but not contrasting so strongly with the dorsum; remainder of praescutum with a central brown stripe, more clearly defined behind; scutal lobes yellow, the mesal half of each dark brown; median region of scutum and the scutellum clear light yellow; central portion of mediotergite weakly infuscated. Pleura chiefly dark brown, deepening to intense black on the dorsal border adjoining the yellow dorsal stripe, the upper margin of this area unusually clear-cut, passing beneath the wing root to the base of the halteres and abdomen. Halteres infuscated, the base of stem narrowly yellow. Legs with the coxae blackened; trochanters obscure yellowish brown; femora weakly infuscated, the tips narrowly obscure yellow; tibiae and tarsi chiefly obscure yellow, the terminal tarsal segment black, the penultimate one brown; posterior legs not differently colored from the other pairs. Wings (Fig. 2) with

a weak grayish tinge; a series of about five large darker brown costal areas that much exceed the cream-yellow interspaces; third dark area over origin of *Rs*, fourth at fork of *Sc;* all areas paler behind and merging gradually with the ground; fifth dark area the stigma; elsewhere over the disk are scattered whitish areas, including before and beyond the wing-tip, before and beyond the cord and about four along cell *R;* a conspicuous longitudinal area in cell *1st A*, reaching the margin at end of vein *2nd A;* wing-axilla broadly whitened; veins brown, yellow in the costal interspaces. Venation: Sc_1 ending nearly opposite midlength of *Rs*, Sc_2 at its tip; free tip of Sc_2 subequal to or a trifle exceeding R_2; cell *1st* M_2 about as long as vein M_4; *m-cu* at or immediately before the fork of *M*.

Abdomen brownish black, the basal sternites obscure brownish yellow, the outer segments more suffused; hypopygium blackened. Male hypopygium (Fig. 7) with the tergite *9t*, unusually narrow, its caudal margin conspicuously but shallowly emarginate, each half of tergite with about four setigerous punctures. Basistyle, *b*, with the ventromesal lobe stout, strongly narrowed to the outer aplical angle which terminates in a strong modified seta; on face of style near base of lobe with two further modified setae, these longer and more conspicuous than the terminal one of the lobe, just described. Dorsal dististyle a slender gently curved rod, the elongate tip acute. Ventral dististyle, *vd*, much less enlarged than in *bruchiana*, the dorsal dististyle lying nearest its outer margin; rostral prolongation very long and slender, the entire outer margin with a high elevated pale flange; rostral spines rising close together near the base of the prolongation, subequal in length but one from a more dilated base than the other; two unusually long setae near these spines. Gonapophysis with mesal-apical lobe stout, blackened, the extreme lower or outer angle further produced into a more blackened point or knob.

Holotype, ♂, San Camilo, E. Tachira, October 1944 *(Anduze)*.

I take unusual pleasure in naming this distinct fly for the collector, my friend, Mr. Pablo J. Anduze. The nearest relative is *Limonia (Rhipidia) bruchiana* (Alexander), of Venezuela to Argentina, which differs conspicuously in the coloration of the body and legs, and in various details of structure of the male hypopygium, involving the tergite, basistyle and its setae, the ventral dististyle and gonapophysis.

136. *Limonia (Rhipidia) schwarzi* (Alexander).

1912. *Rhipidia schwarzi* Alexander; Bull. Brooklyn Ent. Soc., 8: 13-14.

San Esteban, Carabobo, December 19, 1939 *(Anduze)*. Hitherto known only from the Greater Antilles and southern Florida.

ERIOPTERINI

137. *Trentepohlia (Paramongoma) ditzleri* sp.n.

Alied to *metatarsata;* general coloration of praescutum yellow, with a broad median brown stripe on posterior half; rostrum light yellow; antennae with scape yellow, pedicel brownish yellow, flagellum black; halteres yellow, the knobs very weakly darkened; femora yellow, deepening to brown before the broad white tips; tibiae brown, the bases narrowly, the apices broadly white; basitarsi darkened on proximal fourth, the remainder and tarsal segment two white; wings whitish subhyaline, unpatterned except for the subcircular dark brown stigma; cell *1st* M_2 subequal in length to vein M_{1+2} beyond it; space on posterior wing margin between tips of veins Cu_1 and *1st A* relatively extensive.

Female.—Length about 11 mm.; wing 7.8 mm.

Rostrum light yellow; maxillary palpi yellow, the outer segments darker. Antennae with scape yellow, pedicel brownish yellow, flagellum uniformly black, the segments cylindrical. Head buffy yellow; anterior vertex reduced to a linear stripe that is only about as wide as a single row of ommatidia, elevated, the carina continued backward onto the posterior vertex, as in various other members of the genus.

Cervical region narrowly infuscated above, yellow on sides. Pronotum yellow, very weakly darkened laterally. Mesonotal praescutum yellow, on posterior half with a broad brown median stripe that is not differentiated in front; lateral praescutal stripes lacking; posterior sclerites of notum dark brown, sparsely pruinose, the scutellum and mediotergite more heavily so; median region of scutum more brightened. Pleura and pleurotergite yellow, including the dorsopleural membrane. Halteres yellow, the knobs very weakly darkened. Legs with the coxae yellow, the fore and middle pairs very slightly more darkened; trochanters yellow; a single entire leg (hind) remains; femora obscure yellow, deepening to medium brown before the broad (1 mm.) white tip; tibiae brown, the bases white, a trifle exceeding the femoral tip; apex of tibia broadly whitened (3.5 mm.), occupying about the outer fourth of the entire tibia (13 mm.); tarsal segments one and two white, the proximal fourth of basitarsi dark brown; third tarsal segment weakly darkened (terminal two segments broken but presumably dark brown). Wings (Fig. 3) whitish subhyaline, the costal border clear yellowish subhyaline, best evidenced by the clear yellow veins *Sc* and R_1; stigma subcircular, dark brown; no other distinct wing pattern; veins brown, except as described. Venation: Much as in *metatarsata;* cell *1st* M_2 shorter and wider, subequal to vein M_{1+2} beyond it; in *metatarsata,* subequal to vein R_5 beyond it; space on posterior margin between the tips of veins Cu_1 and *1st A* relatively extensive, fully one-half *m-cu;* in *metartasata* very narrow; cell *2nd A* broader. In *matarsata,* the wings are slightly more patterned and with the stigma subtriangular in outline.

Abdominal tergites brown, the lateral borders broadly yellow, on the outer tergites the caudal margins similarly yellow; sternites yellow; genital segment chestnut brown; ovipositor with cerci slender, gently upcurved to the acute tips.

Holotype, ♀, Tachira, E. Tachira, April 4, 1920 *(E. B. & J. H. Williamson; W. H. Ditzler). Paratopotype,* 1 broken specimen.

The most similar described species is *Trentepohlia (Paramongoma) metatarsata* (Alexander), of Central America, which differs in the colorational and venational features indicated above. There are now known many Tropical American species of the subgenus having the legs beautifully patterned, as is the case in the present fly, the arrangement of the white annuli being characteristic of the various species. Those forms whose biology is at all known, including *T. (P.) bromeliadicola* (Alexander) (3) and *T. (P.) leucoxena* (Alexander) (4) have been reared from water and vegetable detritus accumulated in the leaf-axils of bromeliads. It is very possible that the present fly will be found to have similar habits.

138. *Trentepohlia (Paramongoma) roraimicola* (Alexander.

1935. *Trentepohlia (Paramongoma) roraimicola* Alexander; Ann. Ent. Soc. America, 28: 329.

Mt. Roraima, summit, altitude 8500 feet, November 1932 *(D. Vessey-FitzGerald)*.

139. *Teucholabis (Paratropesa) amoena* (Alexander).

1922. *Paratropesa amoena* Alexander; Trans. Ent. Soc. London, 1922: 47-48.

The type was from "Venezuela", without more exact locality data, collected by Kaden in August 1857; Vienna Museum.

140. *Teucholabis (Teucholabis) duidensis* Alexander.

1931. *Teucholabis (Teucholabis) duidensis* Alexander; Amer. Mus. Novitates 491: 15-16.

Mt. Duida, December 30, 1928 *(G. H. H. Tate)*.

141. *Teucholabis (Teucholabis) perangusta* Alexander.

1939. *Teucholabis (Teucholabis) perangusta* Alexander; Ann. Ent. Soc. America, 32: 83-84.

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(3) Picado, C. Les Bromeliacees Epiphytes, considerees comme milieu biologique. Bull. soc. zool. Paris, 37: 215-360, pls, 6-24, 54 figs. (Reference pp. 356-357, figs. 50, 51; col. pl. 13, figs. 1, 2, 4); 1912.

(4) Alexander, C. P. A second bromeliad - inhabiting crane-fly (Tipulidae, Diptera), Ent. News, 26: 29-30; 1915. Proc. U.S. Nat. Mus., 48, pl. 24, fig. 7; 1915.

Caracas, D.F., November 14, 1938 *(Vivas-Berthier);* San Esteban, Carabobo, December 30, 1939 *(Anduze).*

142. *Teucholabis (Teucholabis) venezuelensis* (Macquart).

1846. *Limnobia venezuelensis* Macquart; Dipt. exot., suppl. 1: 19, pl. 2, fig. 7.

The types were from Venezuela and Colombia (in Bigot Collectiom). The materials were represented only by females and it is probable that the species will never be recognized.

143. *Gonomyia (Progonomyia) compacta* Alexander.

1941. *Gonomyia (Progonomyia) compacta* Alexander; Journ. N. Y. Ent. Soc., 49: 140-141.

Borburata, Carabobo, altitude 500 meters, March 15, 1940 *(Anduze);* San Esteban, Carabobo, January 1, 1940 *(Anduze).* Male Hypopygium (Fig. 9).

144. *Gonomyia (Gonomyia) anduzei* Alexander.

1940. *Gonomyia (Gonomyia) anduzei* Alexander; Rev. de Entomologia, 11: 302-903, fig. 7.

Los Canales, Naiguatá, D.F., altitude 720 meters, September 24, 1938 *(Vivas-Berthier).*

145. *Gonomyia (Lipophleps) anduzeana* Alexander.

1941. *Gonomyia (Lipophleps) anduzeana* Alexander; Journ. N.Y. Ent. Soc., 49: 141-142.

San Esteban, Carabobo, January 6, 1940 *(Anduze).* Male hypopygium (Fig. 10).

146. *Gonomyia (Lipophleps) borburatana* Alexander.

1941. *Gonomyia (Lipophleps) borburatana* Alexander; Journ. N.Y. Ent. Soc., 49: 143.

Borburata, Carabobo, altitude 500 meters, March 10, 1940 *(Anduze).* Male hypopygium (Fig. 11).

147. *Gonomyia (Lipophleps) parinermis* Alexander.

1940. *Gonomyia (Lipophleps) parinermis* Alexander; Rev. de Entomologia, 11: 903-904, fig. 8.

Los Canales, Naiguata, D.F., altitude 720 meters, September 24, 1938 *(Vivas-Berthier).*

148. *Gonomyia (Lipophleps) prolongata* Alexander.

1940. *Gonomyia (Lipophleps) prolongata* Alexander; Rev. de Entomologia, 11: 904-905, fig. 9.

Rio Chacaito, Miranda, altitude 980 meters, September 18, 1938 *(Vivas-Berthier)*.

149. *Gonomyia (Lipophleps) vindex* Alexander.

1941. *Gonomyia (Lipophleps) vindez* Alexander; Journ. N.Y. Ent. Soc., 49: 142-143.

Borburata, Carabobo, altitude 500 meters, March 15, 1940 *(Anduze)*. Male hypopygium (Fig. 12).

150. *Gnophomyia (Gnophomyia) digitiformis* Alexander.

1941. *Gnophomyia (Gnophomyia) digitiformis* Alexander; Journ. N. Y. Ent. Soc., 49: 144-145.

San Esteban, Carabobo, January 6, 1940 *(Anduze)*.

151. *Gnophomyia (Gnophomyia) fuscocostalis* sp.n.

General coloration of body and appendages, including the palpi, antennae, halteres and legs, black, the thoracic pleura and posterior sclerites of mesonotum pruinose; a yellow spot on either end of pronotal scutellum; antennae relatively long (female), exceeding one-third the length of wing; wings whitish subhyaline ,the prearcular field, cells *C* and *Sc*, and the stigma dark brown; cell *C* immediately basad of *h* whitened; anterior branches of *Rs* diverging very gradually from one another; ovipositor with cerci elongate but with setae to their tips.

Female.—Lenght about 7.5 mm.; wing 5.7 mm.; antenna about 2.3 mm.

Rostrum and palpi black. Antennae black throughout, unusually long for this sex; flagellar segments elongate-oval, the longest verticils subequal in length to the segments. Head black, sparsely pruinose on anterior vertex, the latter broad, fully three times the diameter of the scape; a conspicuous median ridge or elongate tubercle on anterior vertex, its cephalic point extending to between the antennal bases.

Pronotum black, sparsely pruinose; extreme lateral angles of scutellum yellow. Mesonotum black, the praescutum and scutal lobes more polished, the median region of scutum and

the posterior sclerites of notum more grayish pruinose. Pleura black, gray pruinose; dorsopleural membrane black. Halteres short, black throughout. Legs uniformly black. Wings (Fig. 4) whitish subhyaline, the prearcular field, cells *C* and *Sc*, and the very long and narrow stigma dark brown, the latter barely crossing vein R_1 into the cephalic portion of cell R_1; cell *C* before *h* more whitened; veins dark brown. Venation: Sc_1 ending immeditely before the fork of R_{2+3+4}, Sc_2 about opposite the fork of *Rs;* veins R_3 and R_4 long, diverging very gradually from one another; R_{2+3+4} about twice R_{2+3}; *r-m* at or just beyond fork of *Rs* on R_5 cell *1st* M_2 elongate, about equal in length to vein M_3 beyont it; *m-cu* at from one-third to two-fifths the length of cell *1st* M_2.

Abdomen black. Ovipositor with cerci elongate, gently upcurved to the acute tips, with conspicuous setae to the actual apex.

Holotype, ♀, Rio Chacaito, Miranda, altitude 980 meters, September 18, 1938 *(Vivas-Berthier).*

Gnophomyia (Gnophomyia) fuscocostalis is allied to the genotype, *G. (G.) tristissima* Osten Sacken. From all regional members of this group that have the body and appendages, including halteres, blackened, the fly is distinguished by the somewhat characteristic wing pattern, whitish with the costal border narrowly and abruptly infuscated. The discovery of the male sex is much to be desired.

152. *Gnophomyia (Gnophomyia) stenophallus* Alexander.

1941. *Gnophomyia (Gnophomyia) stenophallus* Alexander; Journ. N. Y. Ent. Soc., 49: 145-146.

San Esteban, Carabobo, January 6, 1940 *(Anduze).*

153. *Neognophomyia monophora* Alexander.

1941. *Neognophomyia monophora* Alexander; Journ. N.Y. Ent. Soc., 49: 146-147.

San Esteban, Carabobo, December 28, 1939 *(Anduze);* Borburata, Carabobo, altitude 500 meters, March 10-15, 1940 *(Anduze).* Male hypopygium (Fig. 13).

154. *Cryptolabis (Cryptolabis) nebulicincta* Alexander.

1941. *Cryptolabis (Criptolabis) nebulicincta* Alexander; Journ. N. Y. Ent. Soc., 49: 147-148.

San Esteban, Carabobo, December 19, 1939 *(Anduze)*.

155. *Erioptera (Mesocyphona) quadrifurcata* Alexander.

1938. *Erioptera (Mesocyphona) quadrifurcata* Alexander; Ann. Ent. Soc. America, 21: 117-118.

Rio Chacaito, Miranda, altitudes 980 meters, September 18, 1938 *(Vivas-Berthier)*. Male hypopygium (Fig. 14). Known from southwestern Mexico (Chiapas) to northwestern Ecuador (Bolivar). The most similar described species is *E. (M.) troglodyta* Edwards, from the guacharo caves in Trinidad; this is still insufficiently known but does not seem to be identical with the present fly. Edwards figures it as having the dististyle of the hypopygium three-branched and with the gonapophysis differently shaped.

156. *Molophilus (Molophilus) subfalcatus* Alexander.

1940. *Molophilus (Molophilus) subfalcatus* Alexander; Rev. de Entomologia, 11: 906-907.

Rio Chacaito, Miranda, altitude 980 meters, September 18, 1938 *(Vivas-Berthier)*.

157. *Styringomyia americana* Alexander.

1941. *Styringomyia americana* Alexander; Trans Amer. Ent. Soc., 40: 231.

Borburata, Carabobo, altitude 500 meters, March 14, 1940 *(Anduze)*. Widely distributed in Central and northern South America.

158. *Toxorhina (Toxorhina) longicollis* Pierre.

1924. *Toxorhina longicollis* Pierre; Encycl. Entomol., Diptera, 1: 80-81, figs.

San Fernando de Apure, E. Apure *(M. Grisol)*; Paris Museum. The identity of this fly is not known to me. The species is described as measuring 10 mm. (female, excluding the rostrum); mesonotum grayish yellow, the praescutum with three brown stripes of which the median one is conspicuously bifurcate behind. Femora yellow; tibiae brown, with their tips blackened; tarsi black. Abdomen brownish black, sternites slightly more ferruginous; in the male, hypopygium ferruginous, preceded by a conspicuous blackened ring. Pierre's figures of the male hypopygium indicate a somewhat peculiar structure but are too diagrammatic to be of much service.

159. *Toxorhina (Toxorhina) polycantha* Alexander.

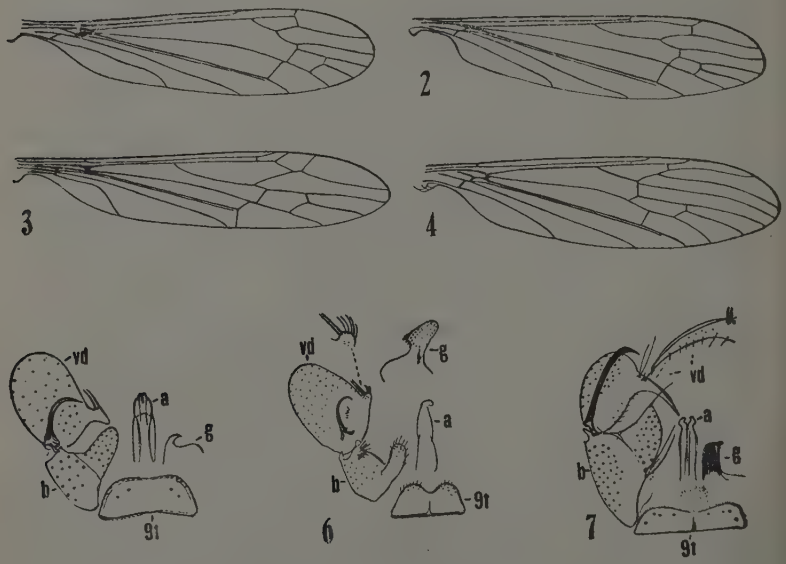
1940. *Toxorhina (Toxorhina) polycantha* Alexander Rev de Entomologia, 11, 907-908.

Rio Chacaito, Miranda, altitude 980 meters, September 18, 1938 *(Vivas-Berthier)*.

160. *Toxorhina (Toxorhina) stenophallus* Alexander.

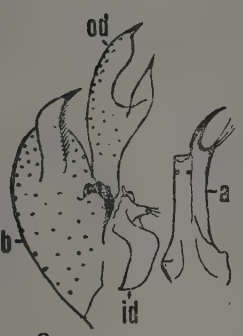
1937. *Toxorhina (Toxorhina) stenophallus* Alexander; Ann. Mag. Nat. Hist., (10) 20: 503-504.

Rancho Grande, Aragua, atlitude 1150 meters, August 27, 1944 *(Lichy)*. Formerly from southeastern Brazil.



EXPLANATION OF FIGURES

Fig. 1.— *Limonia (Dicranomyia) capra* sp.n.; venation.
Fig. 2.— *Limonia (Rhipidia) paulus* sp.n.; venation.
Fig. 4.— *Gnophomyia (Gnophomyia) fuscocostalis* sp.n.; venation.
Fig. 5.— *Limonia (Dicranomyia) capra* sp.n.; male hypopygium.
Fig. 6.— *Limonia (Dicranomyia) subandicola* sp.n.; male hypopygium
Fig. 7.— *Limonia (Rhipidia) paulus* sp.n.; male hypopygium.



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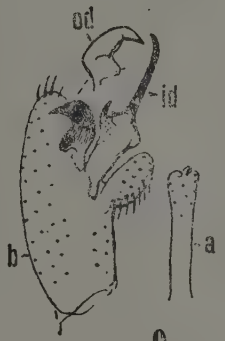

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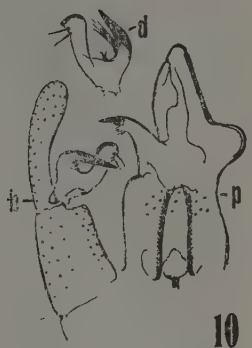

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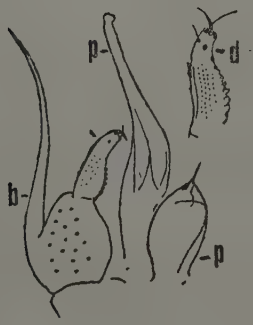

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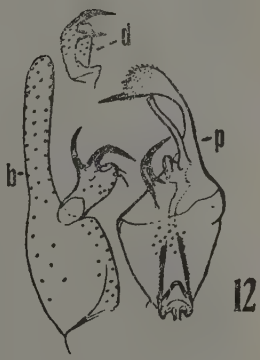

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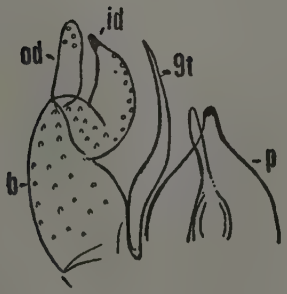

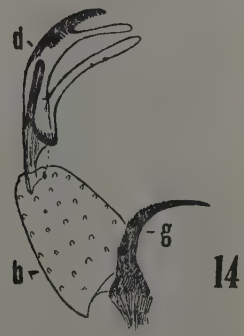

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Fig. 8.— *Teucholabis (Teucholabis) nocturna* Alexander; male *hypopygium.*

Fig. 9.— *Gonomyia (Progonomyia) compacta* Alexander; male *hypopygium.*

Fig. 10.— *Gonomyia (Lipophleps) anduzeana* Alexander; male *hypopygium.*

Fig. 11.— *Gonomyia (Lipophleps) borburatana* Alexander; male *hypopygium.*

Fig. 12.— *Gonomyia (Lipophleps) vindex* Alexander; male hypopygium.

Fig. 13.— *Neognophomyia monophora* Alexander; male hypopygium.

Fig. 14.— *Erioptera (Mesocyphona) quadrifurcata Alexander;* male *hypopygium.*

(Symbols: *a*, aedreagus; *b*, basistyle; *d*, dististyle; *g*, gonapophysis; *id*, inner dististyle; *od*, outer dististyle; *p*, phallosome; *t*, tergal spine).

PART IX

In the preceding eigth article a total of 160 species of crane-flies had been described or recorded from Venezuela. At this time I am adding 20 further species to the list for the republic, bringing the consecutive total to 180.

Virtually all of the new species described herewith were included in an interesting series of specimens collected by my friend, René Lichy, in the Federal District and in the nearby State of Araguá. I am very indebted to Mr. Lichy, not only for his continued interest in saving these fragile flies but for supplying me with certain data concerning these stations. The localities concerned in the present materials are as follows:

"The forests toward Choroni where collections have been made are extremely rich in interesting species. The numbers of insects are not large, due to the altitude, but the included species are invariably of great interest and are but little known. These beautiful forests support an ideal climate (Temp.—Max. 24º Cent., Min. 8º Cent.). René Lichy.

Route Maracay-Choroni (Araguá), "at Km. 25, altitude 1575-1620 meters (5120-5265 feet). Forests very little known, constantly rainy and misty. The route extends from Mara-

cay at 420 meters altitude, mounting to the summit of the Cordillera at 1620 meters at about Km. 25, then descending to the sea at Choroni, Km. 55. I establish my camp at the summit so that I can work either north or south on the slopes of the Cordillera".

El Junquito, Federal District (J).—"Altitude 1.900-2.000 meters (6175-6500 feet), on the crest of the Cordillera; distant from Caracas about 23 kilometers. Forests of limited extent, subtropical, very rainy; many palms and tree ferns. Temperature in January may reach as low as 6º to 7º Cent." René Lichy.

Rancho Grande, Araguá (R. G.—"Altitude 1150 meters (3740 feet), on the route Maracay-Ocumare, at 22 Km. from Maracay. Forests very entensive, similar in character to those at Choroni, descending almost to sea level"—René Lichy.

I am most grateful to my good friends Anduze and Lichy for their continued interest in making known the rich Tipulid fauna of their country.

TIPULINAE

161. *Tipula (Microtipula) niobe* sp. n.

Ground color of mesonotal praescutum reddish yellow, with four poorly indicated, more brownish stripes; antennae (male) more than one-half the length of wing, flagellum black; legs black, the femoral bases restrictedly obscure yellow; claws (male) toothed; wings strongly infuscated, the prearcular and costal fields conspicuously blackened; vein R_{1+2} preserved; cell *2nd A* moderately wide; male hypopygium with the tergite on its ventral median portion with a shieldshaped area that is provided with strong spinoid setae; outer dististyle bearing a blackened spinous hook on the margin before apex; inner dististyle with rostrum unusually slender, strongly upcurved, outer basal lobe very densely setulirerous.

Male. Length about 13 mm.; wing 13 mm.; antenna about 7.5 mm.

Frontal prolongation of head light brownish yellow; nasus long and conspicuous; palpi dark brown, the terminal segment chiefly light yellow, darkened at base. Antennae (male) long, as shown by the measurements, exceeding one-half the length of either the wing or body; scape, pedical and base of first flagellar segment yellow, the remainder of organ black; flagellar segments elongate, very feebly incised; verticils shorter than the segments. Head brown, the front, anterior vertex and orbits yellow.

Pronotum yellowish brown. Mesonotal praescutum with the ground obscure reddish yellow, with four poorly indicated, more brownish stripes, the intermediate pair separated by a very weak pale median line; scutum brown, the central portion concolorous; scutellum more reddish brown, parascutella slighly pruinose; postnotum light brown, the posterior portion gray pruinose; praescutal setae small and inconspicuous, those of the posterior sclerites much longer. Pleura and pleurotergite uniformly yellow. Halteres with stem yellowish brown, knob infuscated. Legs with the coxae and trochanters uniformly yellow; remainder of legs black, the femoral bases restrictedly obscure yellow; tarsi long and slender; claws (male) toothed. Wings with the ground color strongly infuscated; prearcular field, cells *C* and *Sc*, and the stigma even more blackened; distal ends of outer radial cell slightly darker than the ground; veins dark brown. Squama naked. Venation: *Rs* a trifle longer than *m-cu*, gently arcuated; R_{1+2} strongly preserved; petiole of cell M_1 and *m* subequal; *m-cu* on M_4 just beyond origin; cell *2nd A* moderately wide.

Abdomen obscure yellow, the lateral tergal borders black; segments six to nine, inclusive, blackened, the styli paler. Male hypopygium (Fig. 1) with ninth tergite, *9t* broadest across base, narrowed outwardly, the apex subtruncate, provided with long dark setae; central protion slightly more produced and continued cephalad on the ventral aspect of the tergal plate as a darkened shield-shaped area that is provided with numerous strong spinous setae. Proctiger, *pr*, a compressed blade, its dorsal lobe appearing rounded or semicircular in outline. Ninth sternite close to the insert-

ion of the dististyles produced into a small spinous point, the surface with dense yellow setae; appendage of the sternite not visible in the slide mount. Basistyle without a modified lobe on mesal face. Dististyles, *d*, distinctive, shaped about as figured; outer style with stem slender, the blade widely expanded, the margin before apex produced into a blackened spinous hook; inner style with the rostrum unusually slender, strongly upcurved; outer basal lobe very densely setuliferous. Eighth sternite unarmed.

Holotype, ♂, Choroni, Km5, 1945 (*Lichy*).

Although evidently allied to species such as *Tipula* (*Microtipula*) *decens* Alexander, *T.* (*M.*) *parishi* Alexander, *T.* (*M.*) *percomptaria* Alexander, and *T.* (*M.*) *sternohirsuta* Alexander, the present fly is quite distinct in the coloration of the wings and legs, and, especially, in the details of structure of the male hypopygium, particularly the tergite, proctiger and both dististyles. The most recent discussion of the subgenus *Microtipula* Alexander is one by the present writer (Rev. de Entomologia, 16: 330-356; 1945).

162. *Tipula (Bellardina) cydippe* sp. n.

Size above medium (wing, male, nearly 20 mm.); mesonotum chiefly dark brown, the praescutum with four cinnamon brown stripes that are margined with darker brown, especially the lateral borders; thoracic pleura yellow, conspicuously patterned with brown, including a broad, more, dorsal stripe; femora yellow brownish black on apical half, enclosing a broad whitish ring; wings grayish brown, conspicuously variegated with darker brown and cream-colored areas. the largest of the latter being a transverse zigzag band at the level of origin of *Rs*, extending from *C* into cell *Cu;* male hypopygium with the tergite bearing blackened marginal lobes, the lateral ones bearing a pencil of setae; outer dististyle pendant, appearing as a flattened blade, at apex produced into a blackened point; inner dististyle a compact darkened blade, the rostral portion obtuse, blackened; ninth sternite with the appendage profoundly bilobed.

Male. Length about 20 mm.; wing 19.8 mm.; antenna about 3.5 mm.

Frontal prolongation of head subequal in elngth to the remainder, obscure yellow above, more infuscated on ventral half; nasus long and conspicuous; palpi black. Antennae moderately long, as shown by the measurments; scape and pedicel yellow, flagellar segments weakly bicolored, the first pale at base, remaining segments blackened basally, the stems more greenish yellow; flagellar segments gently incised; verticils very long, nearly twice the segments. Head above reddish brown, sparsely pruinose; posterior vertex with three scarcely indicated pale brown areas; vertical tubercle very low and inconspicuous.

Pronotum dark brown above, the sides paling to light yellow. Mesonotal praescutum with four cinnamon brown stripes, margined with dark brown, the inner margins of the intermediate stripes forming a continuous dark central vitta that does not reach the suture behind; outer borders of lateral stripes broadly and conspicuously dark brown; posterior interspaces paling to testaceous; humeral and lateral regions yellow, the former enclosing a conspicuous blackened spot; scutal lobes reddish brown posterior interspaces paling to testaceous; humeral and lateral region yellow, the former enclosing a conspicuous blackened spot; scutal lobes reddish brown, bordered by brownish black; central area of scutum obscure yellow in front, enclosing a darker line behind; scutellum blackened, pruinose, more reddened on either side at base, parascutella infuscated; mediotergite brown, pruinose, the posterior third more reddened, extreme cephalic portion brownish black, transversely wrinkled; pleurotergite with the anapleurotergite dark brown, the callosity of the katapleurotergite light silken yellow. Pleura yellow, conspicuously patterned with brown, including a broad more dorsal stripe extending from the cervical region backward, expanded on the anepisternum, more narrowed over the dorsal pteropleurite, barely interrupted before the pleurotergite; lower darkening virtually restricted to the ventral sternopleurite; dorsopleural membrane light yellow. Halteres with stem obscure yellow, knob greenish. Legs with the coxae obscure yellow, the fore and posterior pairs more infuscated basally; all coxae with a darkened apical area; tronchanters greenish; femora yellow, brownish black on

apical half, enclosing a whitish ring that is subequal to or narrower than either darkened annulus; tibiae brown, base narrowly pale, apex blackened; tarsi passing into black; claws (male) toothed. Wings with the ground grayish brown, conspicuously variegated with darker brown and cream-colored areas; prearcular and costal fields brown; stigma small, dark brown; brown areas along cord, over outer half of vein R_{4+5} and as paired marginal spots in outer medial cells; a larger area in cell *M* adjoining vein *Cu* and a comparable postarcular infuscation in cell *R* and *M;* the pale areas include an arcular spot a transverse zigzag band from before the level of origin of *Rs,* extending from *C* across vein *Cu* into cell *Cu;* a small incomplete poststigmal fascia; other small spots before stigma, in outer fourth of cell R_5, central marginal spots in outer medial cells, and two comparable spots in cell *1st A;* a more broken pale band near wing base, from cell *M to* vein *2nd A,* interrupted in cell *1st A;* veins brown, more reddish brown in the brightened areas. Squamal trichia numerous; trichia of veins sparse, in outer medial field restricted to veins M_{1+2} and M_1; no stigmal trichia behind vein *R.* Venation: *Rs* about one-third longer than *m-cu; m* longer than the petiole of cell M_1; *m-cu* at near two-thirds to three-fourths the length of M_{3+4}.

Abdominal tergites brown, the more basal ones variegated by obscure yellow basal rings; proximal sternites yellow; outer segments, including the hypopygium, more uniformly darkened. Male hypopygium (Fig. 2) with the ninth tergite, *9t,* separated from the fused sternite-basistyle, *9s,b,* by a weak suture. Ninth tergite narrowed posteriorly, the caudal margin with three small blackened areas that are more or less decurved; lateral margins of tergite with a larger blackened structure, the margin with a brush or pencil of long yellow setae. Outer dististyle, *od,* pendant, produced into a flattened blade, the outer apical angle further narrowed into a blackened point. Inner dististyle, *id,* a short compact darkened blade, the rostral portion obtuse, blackened, the outer crest with several setae. Ninth sternite *9s,* with profoundly bilobed appendage, the margins upcurved, the tips provided with long pale setae. Eighth sternite unarmed.

Holotype, ♂, Choroni, Km 25, Septmber 1945 (*Lichy*).

The present fly is readily distinguished from the other regional members of the subgenues *Bellardina* Edwards by the pattern of the body and wings, and by the structure of the male hypopygium, including the tergite and both dististyles. The transverse pale band before the cord is distinctive; other species, such as *Tipula* (*Bellardina*) *obliquefasciata* Macquart and *T.* (*B.*) *theobromina* Edwards, have this band strongly oblique.

163. *Tipula (Eumicrotipula) aëdon* sp. n.

Belongs to the *monilifera* group; size relatively large (wing, male, 18 mm.); antennae relatively short, about one-third length of body or wing; basal swellings of flagellum abrupt; mesonotal praescutum buffy yellow, with four very poorly indicated stripes; darkened setigerous punctures of the praescutal interspaces conspicuous; wings brown, rather sparsely variegated with darker brown and cream-colored areas; male hypopygium with the lobes of tergite not produced adjacent to the midline; ninth sternite with a conspicuous oval appendage, its outer margin provided with short dense yellow setae; appendage of eighth sternite long and slender, provided with long yellow setae.

Male. Length about 17 mm.; wing 18 mm.; antenna about 6 mm.

Frontal prolongation of head obscure yellow above, dark brown on ventral half; nasus elongate, pale palpi brownish black, the incisures restrictedly pale. Antennae (male) relatively short, less than twice as long as the palpi and about one-third the length of either body or wing; scape brownish yellow, pedicel yellow; first flagellar segment pale brown, succeeding segments almost uniformly blackened, the stems of the more proximal segments a trifle paler than the abrupt basal swellings. Head light brownish yellow, with a conspicuous median dark brown vitta and with paler brown areas on either side near the posterior orbits.

Pronotum dark brown medially, paler on sides, the sublateral portions obscure yellow. Mesonotal praescutum buffy

yellow, with four very poorly indicated stripes, the intermediate pair especially ill-defined, separated by a capillary dark vitta and vague lateral borders; sublateral stripes entire, paler than the broad brown lateral and humeral portions; several conspicuous dark brown setigerous puncture on the interspaces; scutum with the ground obscure yellow, each lobe with three brown areas, including a lateral darkening, median area narrowly dark brown; scutellum pale brown, lateral portions of the parascutella infuscated; mediotergite with the central portion obscure yellow, with a posterior impression, lateral parts infuscated and weakly pruinose. Pleura and pleurotergite chiefly yellow. Halteres with stem brown, narrowly yellow at base, knob infuscated. Legs with the coxae and trochanters yellow; femore brown, the tips blackened; tibiae and tarsi black; claws (male) simple. Wings with the ground color brown, rather sparsely variegated with brown and cream-colored areas, the darkest color including the prearcular and costal fields, with the stigma; scattered other markings, including seams over *Cu, m-cu,* outer portion of vein R_{4+5} and as an area in cell *M* beyond midlength; pale areas much restricted, the most distinst being an oblique poststigmal band extending caudad through cell *1st* M_2 into the bases of cell M_3 and M_4 prestigmal brightening virtually lacking; a second oblique band across cells *R* and *M* at near midlength of wing; a major area near base of cell *M* and adjoinning part of cell *R;* other scattered pale spots elsewhere over surface; veins brown, more brownish yellow in the pale areas. Venation: *Rs* more than twice *m-cu;* R_{1+2} entire; cell *1st* M_2 pentagonal, relatively broad.

Abdominal tergites pale brown, the sublateral portions extensively more infuscated, the incisures pale; sternites more uniformly obscure yellow; a subterminal brownish black ring; remainder of hypopygium chiefly obscure yellow. Male hipopygium (Fig. 3) with the caudal margin of ninth tergite, *9t,* very gently emarginate, with an additional small V-shaped notch; dorsal surface back from the notch with an incomplete groove; inner angles of the tergal lobes not produced. Ninth sternite, *9s,* with its appendage a conspicuous oval lobe, the outer margin with very dense, relatively short and stout yellow setae, these becoming more sparse and

weak near apex. Basistyle, *b*, with the more ventral portion of the outer margin produced into a weak flange. Outer dististyle,*od*, relatively slender; setae elongate, chiefly at and near apex. Inner dististyle, *id* with the beak relatively narrow; lower beak with a reflexed blackened lobe; outer hood low and inconspicuous; dorsal crest with the setae pale, not forming a strong comb. Gonapophyses, *g*, about as shown, the short inner lobe more darkened, the outer one expanded into a flaring blade with all its angles obtuse. Eighth sternite, *8s*, with the median appendage long and slender, gradually narrowed to the obtuse tip, the length about three times the width across base; surface with very long bright yellow setae.

Holotype, ♂, Rancho Grande, Aragua, June 10, 1945 (*Lichy*).

The present fly is very distinct from the other described members of the group, especially in the wing pattern and in the structure of the male hypopygium. The conspicuous appendage of the ninth sternite is suggestive of that in the otherwise entirely different *Tipula* (*Eumicrotipula*) *carizona* Alexander, of the northern Andes. The most recent discussion of the subgenus *Eumicrotipula* Alexander, including both the *monilifera* and *glaphyroptera* groups, is one by the present writer (Rev. de Entomologia, 17 (*in press*); 1946).

164. *Tipula (Eumicrotipula) flavidula* Alexander.

1940. *Tipula flavidula* Alexander; Ann. Mag. Nat. Hist., (11) 6: 205-207.

Choroni, Km 25, September 3, 1945 (*Lichy*). Formerly from Ecuador and Peru.

165. *Tipula (Eumicrotipula) capucina* sp. n.

Belongs to the *glaphyroptera* group; size medium (wing, male about 15 mm.); mesonotal praescutum yellow, with four entire dark brown stripes, the intermediate pair confluent behind; posterior sclerites of notum with a continuous median brown line extending from the suture to the base of abdomen; pleura yellow, marked with brown to

form two more or less distinct transverse lines; femora brownish black, enclosing a narrow subterminal yellow ring; claws (male) toothed; wings with a highly diversified pattern of pale yellow, medium brown and dark brown; vein R_{1+2} entire; male hypopygium with the caudal margin of tergite feebly notched, with a slender spinous point on ventral margin on either side; basistyle unarmed; ninth sternite with a pencil of long yellow setae; gonapophyses two-armed, the longer arm weakly bilobed at apex; eighth sternite with the appendage long and conspicuous, about four times as long as broad.

Male. Length about 12-13 mm.; wing 15-16 mm.; antenna about 3.3-3.5 mm.

Female. Length about 16 mm.; wing 18 mm.

Frontal prolongation of head yellow on dorsal half, vaguely more infuscated on middorsal line; ventral half dark brown; nasus elongate; palpi dark brown. Antennae with basal three segments yellow, or with the first flagellar segment slightly darker; succeeding flagellar segments weakly bicolored, the basal swellings black, the remainder brown, this pattern continued virtually to the outermost segments; flagellar segments weakly incised, longer than their verticils. Head with front and anterior vertex yellow pollinose, the vertical tubercle swollen, entire, with a capillary darkened median vitta; posterior vertex slightly more brownish yellow.

Pronotum testaceous yellow, with three brown spots. Mesonotal praescutum with the ground light yellow, including the humeral region and sublateral interspaces; four entire dark brown stripes, the intermediate pair divided by a brownish yellow median vitta, lateral stripes broadly reaching the lateral margins; scutum yellow, each lobe with three brown spots, the posterior pair more or less confluent; posterior sclerites of notum yellow, with a conspicuous continuous brown central stripe extending from the suture to the abdomen and virtually continuous with the confluent posterior ends of the intermediate praescutal stripes; pleurotergite extensively infuscated, the ventral callosity with yellow sericeous bloom. Pleura yellow, both the propleura and posterior portion of the mesepisternum conspicuously pattern-

ed with brown, forming more or less distinct transverse lines that alternate with the paler cephalic portions of the mesepisternum and the pteropleurite, the dark color involving the corresponding portions of the dorsopleural membrane; meral region infuscated. Halteres obscure yellow, base of knob weakly infuscated, the apex paler. Legs with the coxae yellow pollinose, the fore pair slightly more darkened; tronchanters yellow; femora brownish black, enclosing a narrow subterminal yellow, the broader outer ring more blackened, the extreme apex paling to reddish brown; tibiae dark brown; tarsi black; claws (male) toothed. Wings with a highly diversified pattern of pale yellow, medium brown and dark brown; subcostal interspaces more saturated yellow alternating with four darker brown subcostal marks that are smaller in area; brown and yellow patterns sub equal in extent, the yellow more prevalent in cells *R* and *M*, especially on the basal portions which are virtually clear; a short poststigmal yellow band; outer portion of cell M_5 entensively yellow; apical border of wing narrowly darker brown, enclosing a small yellow spot at margin of cells *2nd* M_2 M_3 and M_4; more whitened mark across cell *1st* M_2 and into base of cell M_3; veins brown, paler in the brightened areas, especially veins *Sc* and *R*. Veins beyond cord with abundant macrotrichia; squama naked. Venation: *Rs* relatively long, about two and one- half times *m-cu;* R_{1+2} entire but with the outer half pale and without trichia; *m* and petiole of cell M_1 subequal; cell *1st* M_2 short-pentagonal.

Abdomen orange yellow, the first tergite more infuscated medially; tergites two to five virtually unpatterned excepting on the sides; lateral margins dark brown basally, the outer portions more pruinose; sternites yellow, more or less patterned with dusky before outer ends; outer segments brownish black, variegated with yellow spots or lines, especially marked on the eighth sternite. In the female, abdomen more uniformly orange yellow, the outer segments more restrictedly patterned with darker. Ovipositor with cerci long, very slender, nearly straight. Male hypopygium (Fig. 4) with the ninth tergite, *9t*, transverse, the posterior margin unevenly convex, with a tiny quadrate median notch that is subtended on either side by a scarcely evident trun-

cated lobe; still more laterad along the margin and chiefly on the ventral surface lies a slender fingerlike or spinous point; posterior border of tergite yellow, bordered behind by brown. Ninth sternite, *9s*, with a pencil of long yellow setae at its apex. Basistyle, *b*, very small, entire unarmed. Outer dististyle, *od*, long and slender, flattened, provided with relatively short setae. Inner dististyle, *id*, elongate, both the beak and lower beak blackened, the crest behind the beak with parallel ridges; dorsal crest with numerous long pale setae, very delicate and not forming a comb. Gonapophyses, *g*, distinctive in form, heavily sclerotized, the short body forks into two unequal arms, the longer one constricted before the very feebly bilobed apex. Eighth sternite, *8s*, strongly narrowed posteriiorly, the median appendage long and conspicuous, about four times as long as wide.

Holotype, ♂, Choroni, Km 25, September 4, 1945 (*Lichy*). *Allotopotype*, ♀, September 5, *Paratopotype*, ♂, September 2, 1945.

The most similar described species include *Tipula (Eumicrotipula) arecuna* Alexander, *T. (E.) conspicillata* Alexander, *T. (E.) duidae* Alexander, and *T.* (*E.*) *steinbachi* Alexander, all of which differer in the details of coloration of the body and wings and, especially, in the struture of the male hypopygium, involving virtually every part.

LIMONIINAE

LIMONIINI

166. *Limonia* (*Limonia*) *esau* sp.n.

Belongs to the *fumosa* group; size large (wing, male, over 12 mm.); general colorations of mesothorax almost uniformly reddish brown; antennae black, the flagellar segments subcylindrical, with short abrupt apical pedicels; legs dark brown or brownish black; wings obtuse at tips, strongly infuscated, with a restricted brown pattern; outer cells from Sc_1 to M_3, inclusive, with numerous macrotrichia; R_2 greatly reduced to punctiform; vein *2nd A* strongly sinuous

on outer two-thirds or more; male hypopygium with the rostral prolongation short and broad, its apex obtuse to subtruncate.

Male. Length about 9 mm.; wing 12.5 mm.

Rostrum black basal two segments of palpi black, the outer ones a trifle paler. Antennae black; flagallar segments subcylindrical, with short abrupt apical pedicels, the outer segments becoming progressively more elongate; terminal segments about one-third longer than the penultimate; verticils of the intermediate segments subequal in length to the segments. Front and cephalic portion of anterior vertex silvery, posterior portion of head blackish, the posterior orbits very narrowly and vaguely pale; anterior vertex narrow, scarcely as wide as two rows of ommatidia.

Pronotum pale brown. Mesothorax almost uniformly reddish brown, without distinct pattern; scutal lobes scutellum, dorsopleural membrane and pteropleurite a trifle darkened. Halteres elongate, infuscated, base of stem restrictedly brownish yellow. Legs with the coxae and trochanters reddish brown; remainder of legs dark brown to brownish black; claws with elongate basal and medial teeth, without further microscopic denticles. Wings (Fig. 5) strongly infuscated; a restricted brown pattern, including narrow seams at fork of *Sc,* origin of *Rs,* stigma and outer end of cell *1st* M_2; veins brown. Outer cells of wing, from Sc_1 to M_3 inclusive, with numerous macrotrichia, these restricted to the central portions of the cell (in figure, their punctures indicated by dots); wing apex very obtuse. . Venation: *Sc* long, Sc_1 ending about opposite five-sixth the long *Rs,* Sc_2 longer than Sc_1; R_2 greatly reduced to punctiform, the free tip of vein Sc_2 correspondingly long, erect; outer ends of veins R_3 and R_{4+5} deflected strongly caudad; cell *1st* M_2 closed rectangular, a trifle shorter than vein M_4 ; *m-cu* close to the fork of *M;* vein *2nd A* strongly sinuous on the outer two-thirds or three-fourths, not evenly convex as in *mesotricha.*

Abdomen, including hypopygium, dark brown, the eighth segments paler. Male hypopygium (Fig. 6) with ventral dististyle, *vd,* provided with very long conspicuous setae;

rostral prolongation short and broad, its apex obtuse to subtruncate. Gonapophpsis, *g*, with mesal-apical lobe appearing as a long slender blackened spine.

Holotype, ♂, Choroni, Km 25, September 3,1945 *(Lichy)*.

The present fly somewhat resembles other large species of the *fumosa* group, including *Limonia* (*Limonia*) *grossa* Alexander and *L.* (*L.*) *ingens* Alexander, differing conspicuously in the presence of numerous macrotrichia in the outer cells of wing and in all details of structure of the male hypopygium. In the hairy wings it agrees only with *L.* (*L.*) *mesotricha* Alexander, a much smaller fly with the coloration and venation quite distinct.

167. *(Limonia) (Limonia) fumosa* (Alexander).

1912. *Furcomyia fumosa* Alexander; Canad. Ent., 44: 364.

1 ♂, "El Hotel", Rancho Grande, Aragua, altitudde 1100 meters, January 9, 1937 *(Vivas Berthier)*; collector's number 3.

The type of this species was from Amatuk, British Guiana, taken July 14, 1911, by Frank E. Lutz. In more recent years the species has been taken in various places in Central America. I had earlier considered the present material as representing *L.* (*L.*) *insularis* (Williston 1896), which is still known only from the unique type male taken on the Island of Saint Vincent, Lesser Antilles, altitude 1000 feet, by H. H. Smith. The description and especially the figure of the latter is quite distinct from all material of the present fly that I have seen, differing in the following important venational details: *Sc* much shorter, with both Sc_1 and Sc_2 ending about opposite midlength of *Rs*, the latter not perpendicular at origin; free tip of vein Sc_2 much more oblique, not perpendicular and in transverse alignment with vein R_2; cell *1st* M_2 longer, exceeding any of the veins beyond it. Wing tip strongly infuscated. Unless Williston's figure is entirely erroneous, the two species seem amply distinct.

168. *Limonia (Dicranomyia) brevicubitalis* sp.n.

General coloration of thorax polished brownish black, the sides of praescutum more reddish brown with more or less distinct greenish tints; rostrum, palpi and antennae blackened; halteres short, knobs infuscuted; fore coxae darkened, remaining coxae yellow; femore infuscated, the tips narrowly and incospicuously yellow; wings with a general dusky tinge, indistinstly patterned with darker brown, including the stigma and a confluent cloud over the anterior cord; venation of male differing from that of female, especially in the very short distal section of vein Cu_1 and the strongly incurved tips of the Anal veins; male hypopygium with the ventral dististyle large and fleshy, the rostral prolongation with two spines that are placed close together; gonapophysis with mesal-apical lobe slender.

Male. Length about 7 mm.; wing 7.5 mm.

Female. Length about 8 mm.; wing 7.8 mm.

Rostrum and palpi black, the former relatively short. Antennae black throughout; basal flagellar segments oval, passing through elongate oval to elongate cylindrical; terminal segment longest, about one-third longer than the penultimate; verticils of intermediate segments subequal in length to the segments themselves. Head brown; anterior vertex narrow, less than the diameter of the scape.

Pronotum brownish black, paler on sides. Mesonotal praescutum reddish brown laterally, in cases with greenish tints, the median region conspicuously blackened, the surface polished; scutal lobes brownish black, the median region pale; scutellum blackened, the posterior border more obscure yellow; postnotum reddish brown to darker brown. Pleura greenish yellow, the propleura and mesepisternum more infuscated, this color including the fore coxae. Halteres short, stem obscure yellow, brighter at base, knob infuscated. Legs with coxae light yellow, fore pair darkened, as described; trochanters yellow; femora infuscated, the tips narrowly and vaguely more yellowed; tibiae and basitarsi brown, the outer tarsal segments more blackened. Wings (Fig, 7, ♂) with a general dusky tinge, rather indistinctly patterned with darker brown, including the stigma, a confluent cloud over the ante-

rior cord, and a more or less evident wash over the wing at about one-third the length; cell *Sc* darker than cell *C;* veins brown. Venation: In male, wings and venation more modified, including a more or less distinct emargination along the Anal border; Sc_1 ending about opposite origin of *Rs,* Sc_2 some distance fron its tip, Sc_1 alone about one-half the strongly arcuated *Rs;* cell *1st* M_2 relatively large, about as long as the distal section of M_{1+2}; *m-cu* about one-fourth its length beyond the fork of *M;* distal section of Cu_1 very short, subequal to or a little shorter than the the basal section of M_{3+4}; Anal veins at tips curved abruptly into the border. In female, venation more normal; *Rs* less strongly arcuated; *m-cu* at fork of *M;* distal section of Cu_1 slightly longer but less than one-half *m-cu;* Anal veins not curved strongly into the margin.

Abdominal tergites, including hypopygium, dark brown; sternites light yellow, with abundant short erect setulae. Ovipositor with cerci slender, almost straight; genital shield blackened. Male hypopygium (Fig. 8) with the tergite, *9t,* relatively small, its caudal border emarginate, the low lobes with numerous setae. Basistyle,*b,* small, the area only about one-fourth to one-fifth that of the large ventral dististyle; ventromesal lobe simple. Dorsal dististyle strongly curved, widest on the basal two-thirds. Ventral dististyle, *vd,* with setae distributed over the surface, with a concentration of bristles on the mesal face immediately caudad of the rostral prolongation; the latter relatively small, chiefly glabrous, with two long spines that are placed close together, the spines about equal to the entire length of the prolongation; apex of the latter with two yellow flattened bristles. Gonapophysis, *g,* appearing as broadly flattened plates, mesal-apical lobe slender, narrowed to the subacute tip.

Holotype, ♂, Rio Chacaito, Miranda, altitude 980 meters, September 18, 1938 (*Vivas-Berthier*); Nº 50. *Allotype,* ♀, Los Venados, Federal District, altitude 1520 meters, February 26, 1939 (*Vivas-Berthier*). *Paratype,* 1 ♂, with the allotype.

This fly is closest to *Limonia (Dicranomyia) mulsa* Alexander, which likewise has a more or less dimorphic type

of venation in the sexes though quite different from the present fly. In this latter species, the distal section of vein Cu_1 is shorter than in any other *Limonia* known to me.

169. *Limonia (Peripheroptera) lichyella* sp.n.

Size relatively large (wing, male, 10 mm.); thorax almost uniformly reddened, variegated only by a blackened spot on each scutal lobe behind the suture; antennae black throughout, flagellar segments long-cylindrical; legs blackened, the femoral bases obscure yellow; wings with the central portion of disk yellow, the apex pale brown, the costal border conspicuously dark brown; *m-cu* oblique, about one-third its length beyond the fork of *M;* cell *2nd A* narrow, only slightly widened outwardly.

Male. Length about 6.5 mm.; wing 10 mm.

Rostrum dark brown; palpi black. Antennae black throughout; first flagellar segment with a short basal stem; succeeding segments passing into long-cylindrical; verticils long and conspicuous, exceeding the segments in length. Head dark brown, with a sparse yellow pollen, more reddened behind; anterior vertex about four times the diameter of scape.

Pronotum infuscated above, more reddened on sides. Mesothorax almost uniformly reddened, variegated by a blackened spot on each scutal lobe, placed near the anterior lateral portion behind the suture. Halteres with stem dark brown, obscure brownish yellow at base, knob blackened. Legs with coxae reddish; trochanters yellow; femora blackened, the bases obscure yellow, somewhat narrower and more abrupt on the fore pair; remainder of legs black. Wings (Fig. 9) with the central portion of disk yellow; costal border dark brown, extending from the base to just beyond the stigma, more widened on outer portion; narrow but conspicuous similarly colored seam over arculus and along cord, the latter ending at the fork of *M;* wing-tip and posterior border as far basad as vein *1st A* paler brown, the apical darkening beginning about at the level of outer end of cell *1st* M_2, slightly more distad in cells R_3 and R_5; prearcular field essentially pale; veins brownish yellow in the palest areas, be-

coming dark brown in the infuscated portions. Venation: Sc_1 ending about opposite origin of the short *Rs*, free tip of Sc_2 lying a distance before the level of R_2 that is slightly longer than the length of *Rs;* cell *1st* M_2 and outer section of vein M_{1+2} subequal in length; *m-cu* oblique, about one-third its length beyond the fork of *M;* cell *2nd A* narrow, only slightly widened outwardly, the portion beyond the arcular line about equal to the basal part to the interanal vein.

Abdomen with the basal segments obscure brownish yellow, the remainder, including hypopygium, black.

Holotype, ♂, Choroni, Km 25, September 3, 1945 (*Lichy*).

I take great pleasure in naming this beautiful crane-fly in honor of the collector, Mr. René Lichy. The species is quite distinct from all others in the subgenus having the thorax uniformly reddened or virtually so. Among such species it comes closest to flies such as *Limonia* (*Peripheroptera*) *atrosignata* Alexander, of Panama, differing conspicuously in the coloration of the legs and wings and in the details of venation.

170. *Limonia* (*Geranomyia*) *immerita* Alexander.

1929. *Limonia (Geranomyia) immerita* Alexander; Journ. N. Y. Ent. Soc., 37: 402-403.

Mt. Roraiima, 1932 (*J. G. Myers*); Nº 3284. "Seeping in the bog which is dominated by an erect Bromeliad and the truly magnificent orchid-like *Utricularia humboldti;* altitude 7.000 feet; November 21, 1932"—J. G. Myers. The species was formerly known fron Paraguay.

171. *Limonia* (*Geranomyia*) *scolopax* (Alexander).

1913. *Geranomyia scolopax* Alexander; Ent.. News, 24: 408. Santo Domingo, Edo. Tachira October 7, 1944 *(Anduze).* Formerly from Guatemala, southward to Ecuador and Peru.

172. *Helius* (*Helius*) *myersiellus* Alexander.

1935. *Helius* (*Helius*) *myersiellus* Alexander; Ann. Ent. Soc. America, 28: 322-323.

Near Mt. Roraima (*J. G. Myers*); Nº 3205. "Stretch of bush within sight of Roraima, altitude about 3000 feet. Mixed rain-forest with Melastome-Rubiaceuos undergrowth, very ordinary looking for the elevation. Trees tall. A considerable number of ferns. *AStrychnos* near to if not identical with *toxifera,* scrambling over forest floor. Maurukau to Arabopo, November 15, 1932"—J. G. Myers. It would seem that this record pertains to Venezuela rather than to British Guiana.

173. *Helius* (*Helius*) *panamensis* Alexander.

1934. *Helius* (*Helius*) *panamensis* Alexander; Ann. Ent. Soc. America, 27: 63. Caño Grande, (Estado Táchira), July 17, 1945 (*Anduze*).

HEXATOMINI

174. *Epiphragma (Epiphragma) sybaritica* sp.n

Allied to *nigroplagiata;* antennae with the scape yellow; mesonotal praescutum brownish yellow, the sides behind the fovea with a black spot; scutal lobes with two widely separated black areas; pleura yellow, transversely patterned with black; femora yellow with two black rings; wings pale yellow, the costal field deeper yellow, the disk heavily patterned with brown; *m-cu* beyond one-third the length of cell *1st* M_2; male hypopygium with the tip of the interbase moderately recurved.

Male. Length about 9 mm.; wing 10 mm.; antenna about 2.5 mm.

Antennae with scape yellow; pedical relatively long, yellow basally, the apical third darkened; fusion-segment yellow, composed of two segments; second flagellar segment black, partially fused but with the suture and basal constriction evident; succeeding segments black, long-cylindrical, with verticils that are a little shorter than the segments. Head above chiefly yellow, variegated with brown.

Pronotum yellow, the sides with a small black spot. Mesonotal praescutum chiefly brownish yellow, including the stripes that are a little more pruinose; sides of sclerite behind

the fovea with a large oval black spot, humeral region less evidently darkened; scutum with median area pruinose, lobes brownish yellow, each with two widely separated black areas, the smaller one far laterad behind the suture; scutellum black, parascutella yellow; mediotergite yellow, sparsely pruinose, with a large black basal triangle, its point directed backward; pleurotergite yellow, with a large brownish black area that is more or less connected with a smaller spot on the ventral pteropleurite. Pleura yellow, the dorsal mesepisternum blackened, including much of the dorsopleural region, most of the anepisternum and the upper anterior angle of the sternopleurite. Halteres with stem yellow, knob infuscated. Legs with the fore coxa obscure yellow; mid-coxa with anterior face infuscated, hind coxa yellow; trochanters obscure yellow; femora yellow with two narrow black rings on outer half, these narrower than the enclosed yellow annulus, the tip yellow; tibiae and tarsi brownish yellow. Wings (Fig. 10) with the ground color pale yellow, of the prearcular and costal fields more saturated yellow; a heavy brown pattern that exceeds the ground in area, in part ocelliform, with centers at origin of *Rs*, anterior cord, outer end of cell *1st* M_2 and fork of M_{1+2}; cell *2 nd A* with about six transverse dashes, margin of cell *1st A* with three, basal portion of cells *Cu* and *1st A* more uniformly infuscated; veins brown, yellow in the costal interspaces. Venatioin: *Rs* relatively short, angulated at origin; petiole of cell M_1 about three times *m; m-cu* beyond one-third the length of cell *1st* M_2.

Abdominal tergites obscure brownish yellow, more infuscated laterally; sternites clearer yellow; subterminal segments with a narrow brownish black ring; apendages of hypopygium chiefly obscure yellow; male hypopygium with the tergal lobes small, separated by a deep median split. Outer dististyle with the tip a strongly curved spine. Interbase with its tip moderately recurved.

Holotype, ♂, Choroni, Km 25, September 12, 1945 *(Lichy).*

The present fly most resembles species such as *Epiphragma (Epiphragma) diadema* Alexander, *E. (E.) enixa*

Alexander, and *E.* (*E.*) *nigroplagiata* Alexander, particularly the last, differing in all details of coloration of the body and wings.

175. *Epiphragma* (*Epiphragma*) *mephistophelica* sp.n.

Size large (wings, female, over 12 mm.); general coloration of mesonotum grayish yellow to gray, the anterior border of praescutum broadly dark brown; antennae with scape and pedical brown, fusion-segment yellow; knobs of halteres infuscated; femora brownish yellow, the outer segments of leg darker brown; wings obscure fulvous, with a spotted and very abundantly dotted pale brown pattern; anterior cord oblique, cell *1st* M_2 lyng most distally; abdominal tergites dark brown, sternites yellow.

Female. Length about 12 mm.; wing 12.5 mm.; antennae about 3.4 mm.

Rostrum brown; palpi black. Antennae with the scape and pedicel brown, the fomer somewhat paler above; fusion-segment yellow, brown basally, including two completely fused segments; remainig segments black, long-cylindrical, the long scattered verticils, the longest subequal in length to the segments; surface of segments with abundant short black setulae arranged in palmate groups. Head above brown, sparsely pruinose, with indications of a capillary darker line on the posterior vertex; posterior orbits narrowly oscure yellow.

Pronotum dark brown, margined with light gray. Mesonotal praescucutum with the cephalic and lateral margins broadly dark brown, the remainder of disk light grayish yellow (type) to buffy, with four poorly indicated, more grayish brown stripes; scutum yellownish gray, the lobes vaguely patterned with brown; scutellum brown, somewhat darker basally; mediotergite light gray pruinose, heavily infuscated on the lateral and posterior portions; pleurotergite light gray, the posterior portion dark gray, confluent with the lateral darkening on mediotergite. Pleura and coxae gray, with small brown spots, chiefly on the propleura, mesepisternum and on bases of all coxae, the more dorsal series of spots forming an incomplete dorsal stripe that ends at the pteropleurite. Halteres with stem obscure yellow, clearer yellow

at base, knob infuscated. Legs with coxae as described; trochanters yellow; femora obscure brownish yellow, somewhat darker brown at tips; tibiae yellowish brown, clearer yellow at base; tarsi dark brown:. Wings (Fig. 11) with the ground obscure fulvous, heavily spotted and dotted with brown and pale brownish gray, the ocelliform pattern virtually lost; the darker brown spots lie along costa, the major ones at origin of *Rs,* fork of Sc, stigma and tip of vein R_3; a vague clouding over cord and fork of M_{1+2}; elsewhere in all cells with abundant dots, becoming confluent in the cubital and anal cells; veins brownish yellow, somewhat darker in the clouded portions. Venation: Anterior cord oblique, with cell *1st* M_2 lyng most distally; *m-cu* from about one-fourth to about two-thirds its own length beyond the fork of *M.*

Abdominal tergites dark brown; sternites yellow; basal tergites vaguely brightened; genital shield elongate, obscure orange yellow. Ovipositor with cerci slender, gently upcurved, horn-colored.

Holotype, ♀, Choroni, Km 25, September 5, 1945 *(Lichy).*

Paratype, ♀, El Junquito, March 1945 (*Lichy*).

There are now relatively numerous species of the genus in Tropical America having the wings abundantly dotted with brown and with the usal ocelliform pattern much reduced to virtually obsolete. Among such species the present fly comes closest to the Peruviian *Epiphragma* (*Epiphragma*) *muscicola* Alexander, which differs in all details of coloration of the body, legs and wings and in several details of structure.

176. *Epiphragma* (*Epiphragma*) *petalina* sp.n.

Allied to *solatrix;* size large (wing, male, over 12 mm.); mesonotum dark brown, with a conspicuous yellowish gray transverse saddle that involves the posterior portion of the praescutum and anterior three-fourths of the scutum; antennae with flagellar segments beyond the fusion bicolored, terminal segment yellow; femora pale brown, the extreme base and apex vaguely paler; tibiae and tarsi yellow; wings whitish subhyaline, with a handsome brown pattern of the general type of *solatrix.*

Male. Length about 12 mm.; wing 12.8 mm.; antennae about 2.7 mm.

Rostrum above brown, gray pruinose, darker on sides; palpi black; the incisures restrictedly paler. Antennae relatively short; scape black, pedicel reddish brown; fusion-segment yellow, succeeding segments bicolored, dark brown with the apices narrowly yellow, this pattern continued virtually to the end; terminal segment uniformly light yellow; fusion-segment consisting of two completely united segments; succeeding segments subcylindrical, shorter than the longest virticils. Head above dark brown, the anterior vertex and broad posterior orbits more reddish.

Pronotum dark brown, the sides of the scutellum vaguely pruinose. Mesonotum dark brown, with a conspicuous yellowish gray transverse saddle, involving the posterior fourth or less of the praescutum and about the anterior three-fourths of the scutum, the area with nearly parallel margins; mediotergite with a conspicuous dark triangle, the surface and especially the apex more silvery pruinose, paler brown at the point of the triangle. Pleura and pleurotergite chiefly dark brown, including the dorsopleural region, the surface sparsely pruinose; dorsal portion of pteropleurite a trifle paler. Halteres infuscated, the base of stem narrowly yellow. Legs with the fore coxae pale, pruinose, remaining coxae dark brown, sparsely pruinose; trochanters brownish yellow; femora pale brown, the extreme base and apex vaguely paler; tibiae and tarsi yellow. Wings (Fig. 12) whitish subhyaline, with a handsome brown pattern arranged more or less as in *sol trix* and allies, the markings in part ocelliform; areas of costal and apical portions more buffy with narrow dark margins, this pattern including also *m-cu* and the outer end of cell *1st* M_2; cells at near mid-width of wings more uniformly infuscate; centers of areas in cells *Cu* and the *Anals* more infuscated but distinctly paler than the narrow margins; dark broken band at level of origin of *Rs* disconnected from that at cord; cell *2nd A* with three dark areas, including the one at end of the vein; basal half of cell *1st A* unpatterned; veins brown in the patterned areas, pale in the ground fields. Venation: *Rs* long, angulated and spurred at origin; vein Sc_{2+} R_1

strongly arched; petiole of cell M_1 slightly longer than *m; m-cu* gently sinuous, about one-half its length beyond the fork of *M;* cell *2nd A* relatively narrow.

Abdominal tergites pale brown, the basal one more yellowed; a very narrow brownish black basal ring on tergites two to four; caudal borders of segments even more narrowly light gray; impressed tergal areas yellow, inconspicuous against the ground; basal sternites obscure yellow; subterminal segments more darkened; hypopygium brownish yellow. Male hypopygium with the tergal lobes relatively small, separated by a narrow V-shaped notch having about the same outline. Outer dististyle with its tip a long slender spine. Inner dististyle a little longer, subspatulate, the tip obtuse. Interbase with the long tip strongly recurved.

Holotype, ♂, Choroni, Km 25, September 8, 1945 (*Lichy*).

The most similar described species include *Epiphragma* (*Epiphragma*) *claudia* Alexander and *E. (E.) solatrix* Osten Sacken, which differ conspicuously in the coloration of the body, antennae, legs and wings.

177. *Epiphragma (Epiphragma) delicatula* Osten Sacken.

1887. *Epiphragma delicatula* Osten Sacken; Berlin. Ent. Zeitschr., 31: 208.

A broken female, El Junquito, March 1945 *(Lichy).* Formerly known only from the unique type male from "Colombia", without more exact data, collected by Carl A. Moritz (1796-1866), now in the Berlin Museum. Since Moritz collectedd (1834 to about 1860) in a part of Venezuela, at that time included in what is now Colombia, it is at least possible that the type of this attractive species was from Venezuela.

178. *Hexatoma (Eriocera) bifurcata* sp.n.

Allied to *ohausiana;* mesonotal praescutum with the ground yellow, with three dark brown stripes; vertical tubercle conspicuously bifurcate by a V-shaped notch; femora yellow, the tips rather narrowly but conspicuously black, the amount subequal on all legs; wings light yellow, contrastingly patterned with brown seams to the veins; vein Sc_1 placed far before Sc_2.

Female. Length about 25 mm.; wing 19 mm.

Rostrum light yellow; palpi black. Antennae with basal three seggents yellow, succeeding segments black; only five segments remain; first flagellar segment longer than the second and third combined. Head orange yellow, somewhat deeper orange behind, posterior orbits slightly pruinose; vertical tubercle relatively large, conspicuous, bifurcated by a V-shaped notch.

Pronotum brown, darker brown on sides. Mesonotal praescutum with the ground golden yellow, with three dark brown stripes, the posterior interspaces slightly obscured behind; humeral region and lateral praescutal borders more narrowly dark brown scutal lobes dark brown, the median area restrictedly and vaguely brightened; posterior sclerites of notum light brown: Pleura obscure brownish yellow, variegated with dark brown, especially on the dorsopleural region, with paler areas on the ventral anepisternum, ventral sternopleurite and on metapleura; a clearer yellow spot on dorsal anepisternum. Halteres with stem yellow, knob dark brown. Legs with the fore and middle coxae brownish yellow, the posterior pair dark brown; trochanters obscure yellow; femora yellow, the tips rather narrowly but conspicuously blackened, the amount subequal on all legs; tibiae yellow, the extreme bases and slightly more extensive tips darkened; tarsi black, the proximal portions of the basitarsi vaguely more brightened. Wings with the restricted ground light yellow, clearest as a basal band extending from *C* to vein *2nd A*, and as a less extensive prestigmal area, clearest in cells *C*, *Sc* and R_1, behind this becoming paler and much restricted by the darkened seams to the veins; remainder of wing almost covered by medium brown clouds, the stigma darker brown; cells *Cu* and *2nd A* uniformly darkened; the yellow color involves about the proximal half of cell *1st A*, the pattern continued distad along both Anal veins; a second brightened area centering over *m-cu;* a whitish longitudinal streak the entire length of cell *R;* outer ends of cells R_2 and R_3 more yellowed veins brown, yellow in the brightened fields. Macrotrichia on veins beyond cord virtually lacking; only a sparse series on distal section of vein R_5. Venation:

Sc_1 placed far before Sc_2, the distance about equal in length to vein R_2, Sc_2 perpendicularly bent into *R; Rs* very long exceeding three times vein R_1; R_{2+3} and R_2 subequal, shorter than R_{1+2}; basal section of vein M_{1+2} weakly angulated to feebly spurred; cell *1st* M_2 a little longer than vein M_3 beyond it; *m-cu* at about two-thirds its length beyond the fork of *M*, one-third longer than the distal section of Cu_1.

Abdomen with the basal segment blackened; tergites two to four, inclusive, yellow, the lateral margins restrictedly darkened; tergites five and six brownish black; outer segments, including the genital shield, obscure orange; sternites chiefly obscure yellow. Ovipositor with the valves long and slender.

Holotype, ♀, Choroni, Km 25, September 12, 1945 *(Lichy)*.

The present fly is most nearly allied to *Hexatoma (Eriocera) interlineata* Alexander, of Panama, and *H. (E.) ohausiana* (Enderlein), of Ecuador, agreeing in the general coloration and, especially, in the peculiar venation of the subcostal field. It differs in details of coloration of the body and wings, in the more bifurcate vertical tubercle, and in the venational details. The wing pattern is much more brilliant and varied than in these other species that have vein Sc_2 extending to some distance beyond Sc_1.

179. *Atarba (Atarba) forticornis* sp.n.

General coloration of thorax dark brown, the humeral region of praescutum obscure yellow; antennae with scape and pedicel yellow, flagellum black, the segments with relatively short verticils and a conspicuous erect white pubescence over the segments; femora yellowish brown, the tips darker brown; wings with a weak brownish tinge, stigma oval, brown; *Sc* relatively long, Sc_1 ending about opposite one-third to two-fifths the length of *Rs;* branches of *Rs* nearly parallel to one another for most of their length; *m-cu* a short distance beyond the fork of *M;* abdomen black, the more proximal tergites variegated with obscure yellow on their basal portions; male hypopygium with the appendage of the ninth sternite relative-

ly long, rectangular, the outer angles produced laterad into slender spines; gonapophysis with apex densely set with small spines to produce a mace-like appearance.

Male. Length about 5.5 mm.. wing 6 mm.; antennae 4.1 mm.

Female. Length about 6 mm.; wing 5.8-6 mm.

Rostrum brown; palpi brownish black. Antennae (male) elongate, approximately two-thirds the wing; scape and pedicel yellow, flagellum uniformly black; flagellar segments elongate-subcylindrical, with an abundant dense white pubescence over the entire segment; a single verticil on each segment, unilaterally distributed, relatively short, about one-half the length of the segment; antennae (female) short. Head dark gray; anterior vertex of male a little wider than the diameter of scape, slightly broader in the female.

Pronotum obscure brownish yellow. Mesonotum almost uniformly dark brown, the humeral region of the praescutum obscure yellow. Pleura light brown, the mesepisternum somewhat darke. Halteres with stem yellow, knob dark brown. Legs with the coxae and trochanters yellow; femora yellowish brown, the tips daker brown, tibiae brownish yellow, the tips narrowly infuscated; tarsi passing into black; tibial spurs present. Wings (Fig. 13) with a weak brownish tinge, the prearcular and costal fields a trifle more yellowed; stigma oval, brown; veins dark brown, a trifle paler in the brightened fields. Venation: Sc_1 ending about opposite one-third to two-fifths *Rs*, Sc_2 some distance from its tip, nearly opposite the origin; *Rs* arcuated to weakly angulated at origin, its branches nearly parallel to one another for most of their length; *m-cu* about one- third to one-half its length beyond the fork of *M*.

Abdomen, including hypopygium, black, the basal sternites more obscure yellow on the proximal portions. Male hypopyguim with the appendage of the ninth sternite relatively long, rectangular, the caudal margin virtually truncate,

each lateral angle produced into a nearly straight slender spine. Outer dististyle with about seven coarse spines along the outer margin, additional to the apex, the more basal ones very small and appressed, the intermediate ones largest; apex shorter than the stouter outer spine. Inner dististyle longer, dark-colored, the apex obtuse. Gonapaphysis with the apex densely set with small spines of different sizes to produce a mace-like appearance. Aedeagus relatively long, strongly sinuous just before apex.

Holotype, ♂, Choroni, Km 25, September 12, 1945 *(Lichy).*

Allotopotype, ♀, with the type. *Paratype,* a bronken ♀, El Junquito, March 1945 *(Lichy).*

Atarba (Atarba) forticornis is readily told from the relatively few other species of the genus having vein *Sc* elongate by the coloration of the body and antennae, and by the structure of the male hypopygium. Such species include *Atarba (Atarba) mexicana* Alexander, and others.

ERIOPTERINI

180. *Trentepohlia (Paramongoma) suffuscipes* sp.n.

Allied to *fuscipes;* mesonotal praescutm fulvous yellow with a broad central dark brown area, beginning at about the anterior third of the sclerite, widened behind; posterior sclerites of notum dark brown, the median region of scutum obscure yellow; pleura and pleurotergite yellow; legs black, the femoral bases restrictedly obscure yellow; wings whitish subhyaline, with a dusky longitudinal cloud that includes the cells beyond the cord; veins R_3 suberect; abdominal segments beyond the basal three uniformly blakened.

Female. Length about 8 mm.; wing 7.5 mm.

Rostrum and basal segment of palpi yellow, outer segments of the latter blackened. Antennae with the scape and pedicel brown, flagellum brownish black; flagellar segments

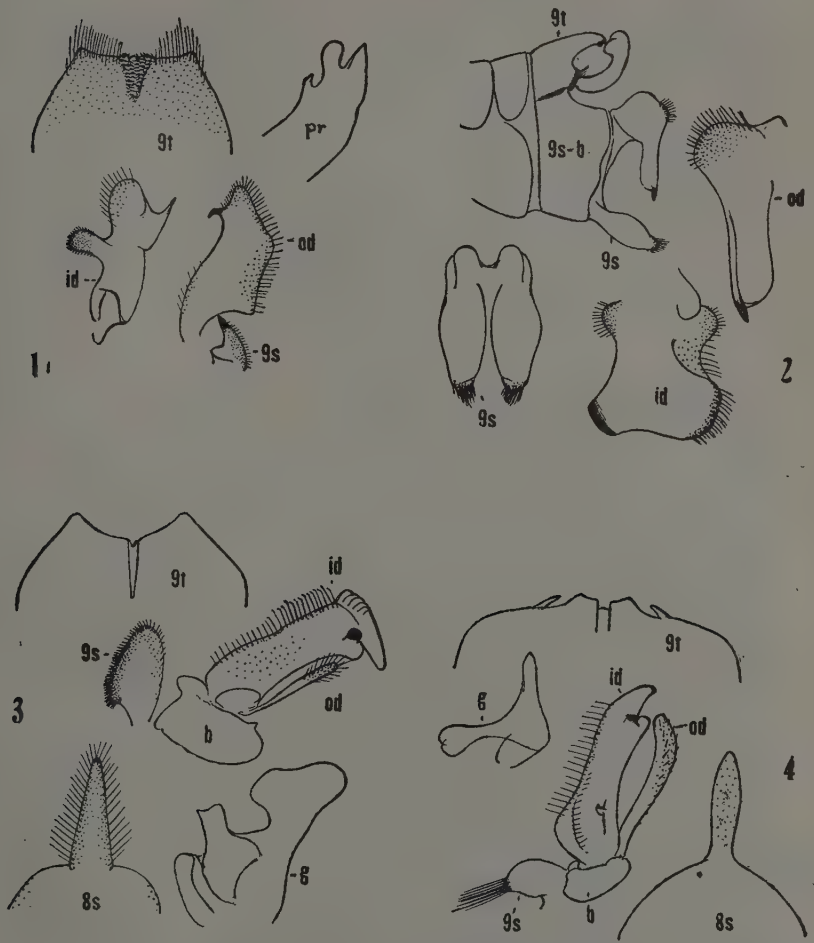
oval to long-oval, the verticils subequal in length to the segments. Head gray; anterior vertex reduced to a narrow strip that is about equal in width to two rows of ommatidia.

Cervical region darkened; pronotum obscure yellow. Mesonotal praescutum fulvous yellow with a broad central dark brown area that begins at about the anterior third of the sclerite, widened behind; posterior sclerites of notum dark brown, the scutellum and mediotergite vaguely more pruinose; median region of scutum obscure yellow. Pleura and pleurotergite yellow. Halteres dark brown, the base of stem obsure yellow. Legs with the coxae and trochanters yellow; femora dark brown, the bases restrictedly and vaguely obscure yellow; remainder of legs black. Wings whitish subhyaline, with a vague dusky cloud over most of wing at near midwidth, the cephalic and posterior thirds of the basal portion remaining of the paler ground; stigma triangular, dark brown; veins brown, somewhat paler in the costal field, in the whitened prearcular area even paler. Compared with *fuscipes,* the dark pattern is more extensive and diffuse, including all cell beyond the cord whereas in *fuscipes,* cell *1st* M_2 and the adjoining cells are abruptly whitened. Venation: R_{2+3+4} about one- half as long as *Rs;* R_{3+4} very short to punctiform; R_{4+5} short, about one-fourth R_{2+3+4}; *m-cu* about one-third its length before the fork of *M;* distance on margin beween tips of veins Cu_1 and *1st A* relatively short, a little more than one-third *m-cu.* Compared with *fuscipes, Rs* is longer; vein R_s more erect, the cell narrower; cell *1st M* more elongate.

Abdomen with basal tergites brown, the lateral portions slightly paler; basal sternites obscure brownish yellow, beyond the third segment the abdomen is uniformly black.

Holotype, ♂, Choroni, Km 25, September 13, 1945 *(Lichy).*

The most similar described species is *Trentepohlia (Paramongoma) fuscipes* Alexander, of the Upper Amazons (Teffé), which differs evidently in the coloration of the body and wings and in the details of venation, as described.



EXPLANATION OF TEXT-FIGURES 1-4

Fig. 1. — *Tipula* (*Microtipula*) *niobe* sp. n.; male hypopygium.
Fig. 2. — *Tipula* (*Bellardina*) *cydippe* sp. n.; male hypopygium.
Fig. 3. — *Tipula* (*Eumicrotipula*) aëdon sp. n.; male hypopygium.
Fig. 4. — *Tipula* (*Eumicrotipula*) *capucina* sp. n.; male hypopygium.
(Symbols: *b*, basistyle; *g*, gonapophysis; *id*, inner dististyle; *od*, outer dististyle; *pr*, proctiger; *s*, sternite; *s-b*, *fused* sternite and basistyle; *t*, tergite).

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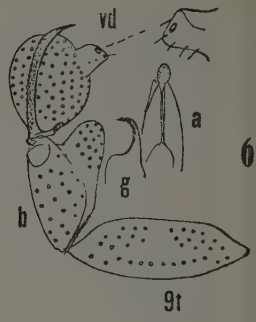

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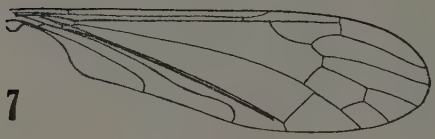

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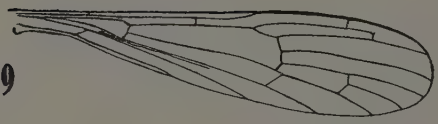

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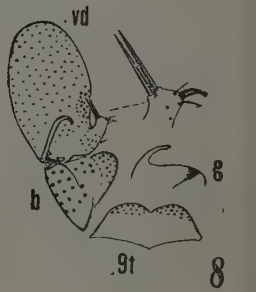

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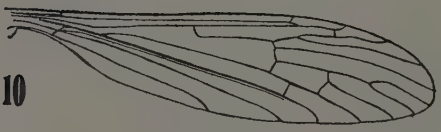

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EXPLANATION OF TEXT-FIGURES 5 - 13

Fig. 5. — *Limonia* (*Limonia*) *esau* sp. n.; venation.
Fig. 6. — *Limonia* (*Limonia*) *esau* sp. n.; male hypopygium.
Fig. 7. — *Limonia* (*Dicranomyia*) *brevicubitalis* sp. n.; venation.
Fig. 8. — *Limonia* (*Dicranomyia*) *brevicubitalis* sp. n.; male hypopygium.
Fig. 9. — *Lominia* (*Peripheroptera*) *lichyella* sp. n.; venation.
Fig. 10. — *Epiphragma* (*Epiphragma*) *sybaritica* sp. n.; venation.
Fig. 11. — *Epiphragma* (*Epiphragma*) *mephistophelica* sp. n.; venation.
Fig. 12. — *Epiphragma* (*Epiphragma*) *petalina* sp. n.; venation.
Fig. 13. — *Atarba (Atarba) forticornis* sp. n.; venation.
(Symbols: *a*, aedeagus; *b*, basistyle; *g*, gonapophysis; *t*, tergite; *vd*, ventral dististyle).

NOTICE

For the past twelve years and particularly since 1939 Venezuelan collectirs (René Lichy, G. Vivas Berthier, Francisco Fernandez Yepes, E. Mondolfi, Charles Ballou and Pablo Anduze) have been sending their material to forein taxomists for determination, the agreement being that part of the material be kept by the specialists and that we be informed of the determinations.

With very few exceptions (Drs. Alan Stone, Nathan Banks, Jos. Bequaert, W. T. M. Forbes, E. L. Bell, M. A. Carriker Jr., Neal Weber, Charles P. Alexander and other members of the Division of Insects, U. S. N. M.) we have had no reports on the material sent, and some have not even acknowledged recipt of the material though we know that it has been received for it has been seen at some Institutions.

Though it gives us great pleasure to collect specimens and to contribute towards the knowledge of our fauna it does us little good that these collections are received, pinned, determined and stored in museum cabinets if we do not even receive a report of the determinations.

We would like to make an appeal to all those to whom material has been sent to give us at least suytematic lists of the material which they have received, if they have no time

to write papers and describe new species. If this is not possible, then we shall be obliged to distribute the material among thoso who are really interested. We are trying to draw up a "Catalogue of Venezuelan Insects" and this is not possible without the assistance of those to whom material has been sent. We would like to extend this appeal to other persons or Institutions who have not received material from us and who would like to study Venezuela, to send us lists of specimens from Venezuela which they may have in their collections. Proper acknowledgments will be made when the Catalogue is published.

A NEW BIRD FLEA FROM VENEZUELA (*AVESOPSYLLA VENEZUELENSIS*, NEW GENUS AND SPECIES)

BY

Irving Fox[1] *and Pablo J. Anduze*[2]

Few wild bird fleas are known from South America and from Venezuela none seem to have been reported heretofore. The new genus described below is of particular interest not only as an addition to the flea fauna of Venezuela but also as a flea of unusual structure. It is related to the other bird flea genera *Ceratophyllus* and *Dasypsyllus* but shows noteworthy differences from both of these. Chief among the distinguishing features are the arrangement of the plantar bristles of the fifth tarsal segment and the conspicuous armature of the movable finger of the clasper.

Family *Dolichopsyllidae*, Subfamily *Dolichopsyllinae* *Avesopsylla*, new genus

1—Department of Medical Zoology, School of Tropical Medicine, San Juan, Puerto Rico.

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Frontal tubercle small acuminate at apex. Eyes black, large and prominent. Labial palpus not extending beyond tip of coxa I, five- segmented. Setae of antennal segment II of female extending well beyond apex of club; in male reaching to the apex. Pronotal comb with about 18 long black spines on a side. Femur I with several setae on outer surface. Fifth tarsal segment of all legs with six pairs of lateral plantar bristles of which five are normal and one, the apical, is longer and more slender; of the six pairs the first third are shifted ventrally and several usually three pairs of other smaller bristles occur between the rows of lateral ones. Anterior abdominal tergites with one to a few spines. Antepygidial bristles in female one long and two shorter ones of which one is much smaller than the other; in male one long and two smaller ones. Female with one receptaculum seminis, its head cylindrical, much longer than broad, longer than the curved tail. In male sternal plate VIII curved, apically membranous and vague. Sternal plate IX with broad lobes on the horizontal arm distally. Movable finger of clasper broad with enlarged pigmented spines near the posterior border. Monotypic. Type, *Avesopsylla venezuelensis,* new species, described below.

Avesopsylla venezuelensis, new species

(Figures 1, 2, 3)

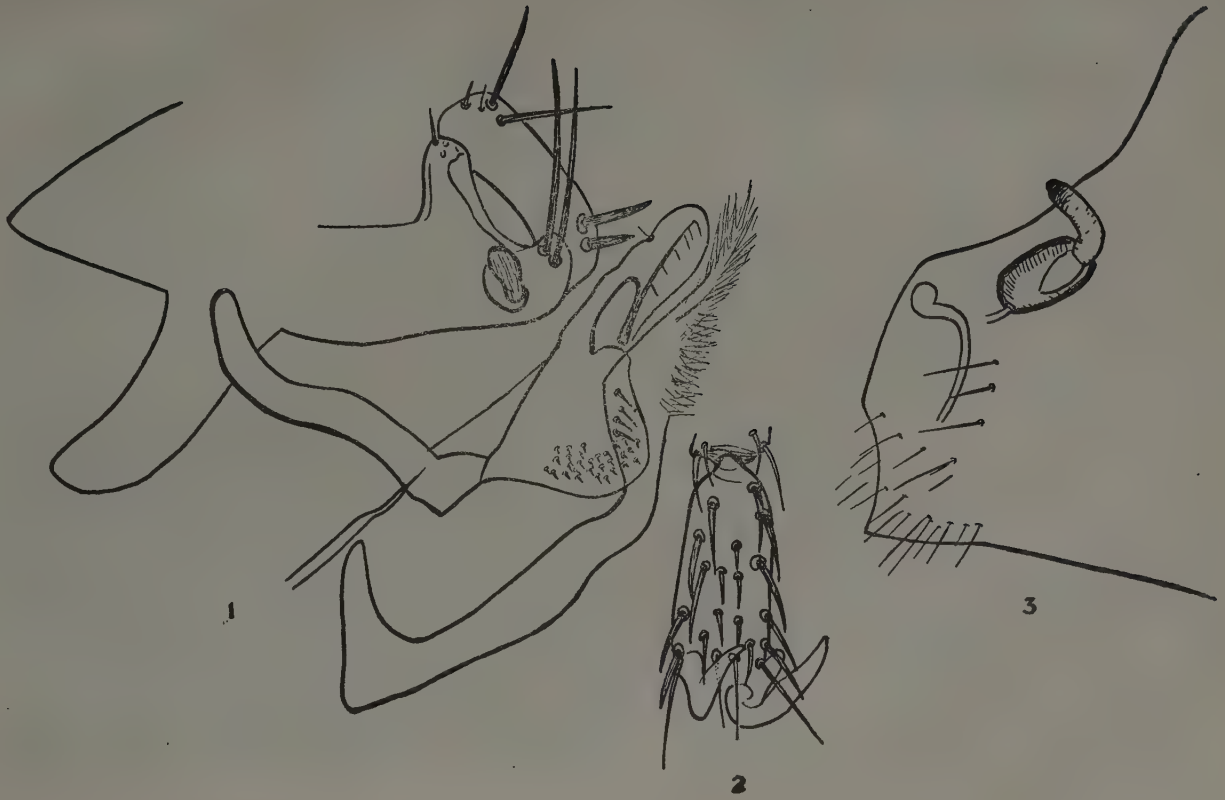
EXPLANATION OF PLATE

Avesopsylla venezuelensis, new species

Fig. 1.—Modified segments of male.

Fig. 2.—Fifth tarsal segment of leg III of female.

Fig. 3.—Sternal plate VII and receptaculum seminis of female.


1
2
3

Male.—Total length, about 2.3 mm. Preantennal region of head with two rows of bristles, the upper row consisting of six and the lower of three much longer ones. Postantennal region with two large bristles near the antennal groove and an irregular row of about five smaller ones. Labial palpus reaching two-thirds down the fore coxa. *Modified segments.* Body of clasper markedly oblong, its process with a single weak bristle apically, its movable finger wider distally than basally with a basal pair of unequal heavily pigmented stout spine-like bristles and an apical pair of longer, slender ones. Vertical arm of sternal plate IX more or less sickle-shaped, the horizontal arm lobed and armed with small bristles. Sternal plate VIII markedly curved, apical much attenuated apparently dendriform. Penis long, broad, its spring short not completing a turn. For further details see Figure 1.

Female.—Total length, about 3.5 mm. General structure as in the male except that the upper of the two preantennal rows of bristles is reduced to five. Sternal plate VII and receptaculum seminis as shown in Figure 3.

Type Material.—Male holotype and female allotype from a swallow's nest at Apartaderos, Estado Merida, 3,300 mts., Venezuela, September, 1944, collected by the junior author, in the School of Tropical Medicine. Male and female paratypes, same data, in the Pablo J. Anduze Collection. The types were selected from a series of specimens. One paratype at each of the following Institutions: U. S. National Museum, Instituto Oswaldo Cruz and British Museum.

Remarks.—The smaller bristles between the rows of lateral plantar ones of the fifth tarsal segment are subject to variation and arrangement. In some specimens the arrangement is more regular than that shown in the illustration of the female allotype (Figure 2) there being three median pairs forming two even rows which are flanked on each side by one (sometimes two) more bristles.

NEOTROPICAL MALLOPHAGA MISCELLANY Nº 2

The genus *Ibidoecus* Cummings

by

M. A. Carriker, Jr.

Genus *Ibidoecus* Cummings

Proc. Zool. Soc. London, Dec. 1916, p. 663 (Genotype: *Docophorus plataleae* Denny).

This genus seems to be confined almost exclusively to the Ibises and Spoonbills, or, in other words, to the family Threskiornithidae, the only known exception being *Aramus scolopaceus,* of the family Aramidae. The family Aramidae has been placed by Ornithologists just before the Rallidae (with the Psophidae between the two).

I could never quite reconcile the placing of *Aramus* here, although its position is undoutedly based on certain anatomical structures. However, the bird in life resembles, and habits much like some of the Ibises, especially the genus *Phimosus,* which it superficially resembles considerably.

The fact that the strongly differentiated Mallophagan genus *Ibidoecus,* found otherwise only on Ibises, is parasitic on the Limpkin, seems to me to be very strong evidence that the latter is closely related to the former, and not to the Rallidae. Not only was *Ibidoecus* taken on three subspecies of *Aramus scolopaceus,* but the species of Mallophaga is very closely related to that found on *Phimosus berlepschi.*

Ibidoecus is readily recognized by the peculiar bipartite clypeal signature, while the genital armature of the male differs greatly from the usual *Philopterus* type. The genotype

of *Ibidoecus*, together with *I. flavus* Cummings and *I. ajajus* n.sp., all from different genera of Spoonbills (from Europe, Africa and Australia) form a closely related group that differs decidedly in several respects from the remaining known species of the genus, so much so that they might easily form a subgenus of *Ibidoecus*, although I am not strongly in favor of subgenera. The two characters which set apart these three species are the pterothorac structure and male genitalia, the latter being exceedingly complex, and entirely different from the remainder of the genus, although both *I. threskiornis* and *I. heterogenitalis*, while having the pterothorax like most of the species, have the genitalia more complictaed and somewhat approaching the *plataleae-flavus-ajajus* group. On the whole it is perhaps best to make no subgeneric division until more species have been discovered.

The known species of *Ibidoecus* now number fourteen, six from Europe, Africa and Australia, and eight from the neotropical region, while many more certainly remain to be discovered.

Key to the known species of *Ibidoecus*.

A. Clypeal signature with lined, or minutely channeled tips.

a. The triangular, abdominal tergites widely separated from the heavy, strongly pigmented pleurites; occipital bands broken (not joined to antennal bands.

bisignatus (Europe)

aa. The triangular abdominal tergites closely fused with pleurites; occipital bands continuous (joined to antennal bands).

b. Head much wider than long; large species with unique genitalia; head in male .90 x 1.05; female, 1.01 x 1.15

threskiornis (Africa)

bb. Head slightly wider than long, or longer than wide, but not more than .03 difference between length and width.

c. Very large species (head ♀ : 1.01 x 1.03)

longiclypeatus (Europe).

cc. Very small species, with head somewhat longer than wide and long, narrow clypeus (♂ :.66 x .61; ♀, .76 x .74); male genitalia of simple type with paramers serrated basally on inner edge and penis winged (see fig.)

d. Paramers longer and more slender (.19 x .06)

s. scolopaceus (S.A.)

dd. Paramers shorter and wider (.14 x .085)

scolopaceus caraui (S.A.)

ccc. Medium sized species, head in ♀ not less than .75 x .78 and not more than .95 x .93.

d. Very large genitalia (paramers no less than .20 long)

e. Paramers thick basally, with strongly *toothed* inner edges basally; portion of penis beyond lateral wings long and thickened.

plegadii (S.A.)

ee. Paramers slender basally, with inner edge only slightly serrated and apical portion of penis short and slender.

bimaculatus (S.A.)

dd. Small genitalia (with large basal plate); paramers not more than .14 long; apical portion of penis rather short and slender (see fig.)

phimosus (S.A.)

bbb. Head considerably longer than wide and size small, probably smallest known species (♀ head: .65 x .60; abdomen .77 x .58); pterothorax angulated over abdomen and tergites almost quadrangular.

hians (Europe).

AA. Clypeal signature not lined or channelled apically and more or less uniformly pigmentd, except for dark frontal edge (not always).

a. A line of pustulated hairs across entire posterior margin of pterothorax; male genitalia very distinctive and size large (see fig. of *ajajus).*

b. Antennae very hirsute; genitalia somewhat different.

flavus (Australia).

bb. Antennae with but two longish hairs on 2nd. segment and two small bristles at end of lst.

c. Size smaller (♂ head: .64 x .84; ♀, .71 x .95)

z *plataleae* (Europe).

cc. Size larger (♂ head, .79 x .89; ♀, .80 x .976).

ajajus (S.A.)

aa. Line of pustulated hairs on pterothorax confined to *each side,* reaching to scarcely more than half way to center line; size small; male genitalia (known only from *heterogenitalis)* of a very different type from other species of genus (see fig.)

heterogenitalis and *fissi-signatus* (S.A.)

Ibidoecus bisignatus (Nitzsch)

Docophorus bisignatus Nitzsch, Zeitschr. f. ges. Naturwiss. 1866, XXVIII, p. 362; Giebel, Insecta Epizoa, 1874, p. 106; pl. IX, fig. 9 (Host: *Plegadis f. falcinellus* (Linné); Piaget, Les Pedicul. Sup., 1885, p. 11, pl. II, fig. 1.

Ibidoecus bisignatus (N.), Cummings, P. Z. S., Dec. 1916, p. 663.

This is a well characterized species found on the European host *Plegadis f. falcinellus.* It has the tips of the clypeal signature lined; the occipital bands are broken (not connected with the antennal bands), and the abdominal structure seems

to be unique in this genus, the triangular tergites being widely separated from the heavy, deeply pigmented and deeply re-entering pleurites. I have seen no specimens from any American host with this type of abdominal structure.

Ibidoecus longiclypeatus (Piaget)

Docophorus longiclypeatus Piaget, Les Pedicul. Sup., 1885, p. 12; pl. II, fig. 2. (Host: *Sittace macao*.—Probably a straggler.—Piaget).

Ibidoecus longyclypeatus (Piag.), Cummings, P. Z. S., Dec. 1916, p. 663.

Harrison has made this species a synonym of *bisignatus* (N.), but I cannot agree with him. The two species, according to both descriptions and figures by Piaget, are entirely different. Piaget says: It belongs to the same type as *bisignatus* Nit. but in comparing it with the figure by Nitzsch and the descriptions by Giebel, it differs in some details, for example: the measurements, the deeply emarginate clypeus, the long trabeculae, the absence of pustules along posterior margin of metathorax (a very important character) which presents nothing more than a clear border; also the chaetotaxy of the abdomen and the head differ.

A glance at Piaget's figure of the two species shows them to be quite different. Unfortunately we do not know the true host, and I have seen no specimens from neotropical (or other) hosts which agree with it. Apparently both *bisignatus* and *longiclypeatus* have the tips of the clypeal signature lined.

Ibidoecus hians (Giebel)

Docophorus hians Giebel, Insecta Epizoa, 1874, p. 107 (Host: *Guara rubra* (Linné); Piaget, Les Pedicul., 1880, p. 91, pl. VII, fig. 7.

Ibidoecus hians (Giebel), Cummings, P. Z. S., Dec. 1916, p. 663.

This is a very small species, perhaps the smallest known of this genus. According to Piaget it has a relatively long head, with clypeus long and sides divergent, while the clypeal sig-

nature is also of the long type, with lined tips, like in *bimaculatus* and other neotropical species. The pterothorax is *angulated posteriorly* (seems to be unique in this respect), and has six long hairs on each side (also characteristic), while the shape of the tergites is rather striking for this group, viz: *"les taches mal limitées sont obtuses, presque quadrangulaires"*.

TABLE OF MEASUREMENTS

Segment	I. bisignatus female		I. longiclypeatus female		I. hians female	
	length	width	length	width	length	width
Body	2.60 to 2.70		3.35	—	—	—
Head	.80	.82	1.01	1.03	.65	.60
Prothorax						
Pterothorax	.45	.65	.56	.80	.40	.50
Abdomen	1.44	1.10	1.80	1.35	.77	.58
Antenna	.26	—	.33	—	—	—

Ibidoecus threskiornis Bedford

16th. Ann. Rept. Direct. Vetern. Res. Union S. Africa, Oct. 1929, p. 526, figs. 30-31.

(Host: *Threskiornis aethiopica* Lath., Zululand, Africa).

This one of the largest species of the genus, with head much wider than long (♀ head, 1.01 x 1.15), and, according to Bedford, "can be distinguished *inter alia* by the genital plates and male genitalia". The genitalia, which is figured, is certainly very different from anything that I have seen, not resembling at all the *flavus-plataleae-ajajus* group, or any of the neotropical species. The genital plates and chaetotaxy of segment IX in the ♀ are also unique (fig. 31 of Bedford).

Measurements	♂		♀	
Head	.90	1.05	1.01	1.15
Prothorax	.31	.66	.33	.71
Pterothorax	.33	.98	.38	1.06
Abdomen	1.43	1.35	2.00	1.65
Total length	2.97		3.72	

Ibidoecus plataleae (Denny)

Docophorus plataleae Denny, Anopl. Brit., 1840, p. 100; pl. IV, fig. 9 (Host; *Platalea l. leucorodia* Linné)

Docophorus sphenophorus Nitzsch, Zeitschr. f. ges. Naturwiss, 1866, p. 310 (Same host).

Ibidoecus plataleae (Denny), Cummings, P. Z. S,. Dec. 1916, p. 663.

Very little can be gleaned from either Denny's, Nitzsch's or Giebel's descriptions and figures of this insect, but Piaget has given us a better description and excellent figure. He shows clearly that the clypeal signature is *not lined,* that the pterothorax has a row of pustulated hairs across the entire posterior margin, the pointed tergites and the peculiar round segment IX in the male and a hint as to the type of the male genitalia. All of the above characters are, I think, found in *I. flavus* Cummings, and certainly are present in *I. ajajus* n.sp., (described below), and setting apart these three species sharply from all the rest of the genus. Cummings has also given useful notes, but figures only the mandibles, to which most of his remarks refer.

Ibidoecus flavus Cummings

Ibidoecus flavus Cummings, P.Z.S., Dec. 1916, p. 665, figs. 16 to 21 (Host: *Platibus flavipes* (Gould, Australia).

This species, together with *I. plataleae* (Denny), is particularly interesting in that they are both of the same type as the neotropical species *ajajus* (described below from *Ajaia ajaja* (Roseate Spoonbill). Cummings' excellent description and figures, together with his references to and comparison with *plataleae* show conclusively that these three species, all from Spoonbills *(Platalea l.leucorodia, Platibus flavipes* and *Ajaia ajaja)* form a compact, closely related group, with several important characters quite different from the other species of the genus, the most important one being the male

genital armature. The bipartite clypeal signature lacks the fine paralell lines (in reality minute channels) on the apical portion, as in *ajajus*, but the antennae are very more hirsute, while the male genital plate is also very similiar to that sclerite in *ajajus*.

Ibidoecus ajajus new species.

figs. 1 to 3

Types, male and female adults, from *Ajaia ajaja* (Linné), collected by the author at Yumbo, Dept. Cauca, Colombia, Aug. 12, 1918 (in coll. of author).

Diagnosis.—I have not been able to compare these specimens directly with material of *I. plataleae* (Denny), but Piaget has given such a good figure and description of that species that a critical comparison may be made. The two are apparently very closely related, and may prove to be conspecific, but for the present I prefer to keep them specifically distinct, in as much as their hosts are generically distinct, at least until material of *plataleae* can be carefully studied.

The species may be recognized by its large size, the short, broad head (much wider than long); short, wide clypeal signature; type of mandibles; occipital bands; the peculiar spiracle in postero-lateral angle of prothorax; the almost continuous row of pustulated hairs across posterior margin of pterothorax (see. fig.) The peculiar sternite in segment I of abdomen is much smaller and shorter than in the other neotropical species. Segment VIII (in ♂) seems to be reduced to two small chitinized plates, one on each side of the large, almost circular, segment IX. The sternal sclerites on II to VI are characteristic, as well as the large genital plate. The chaetotaxy of the abdomen is also considerably different from the male of *scolopaceous* n.sp. and allied forms (see figs.)

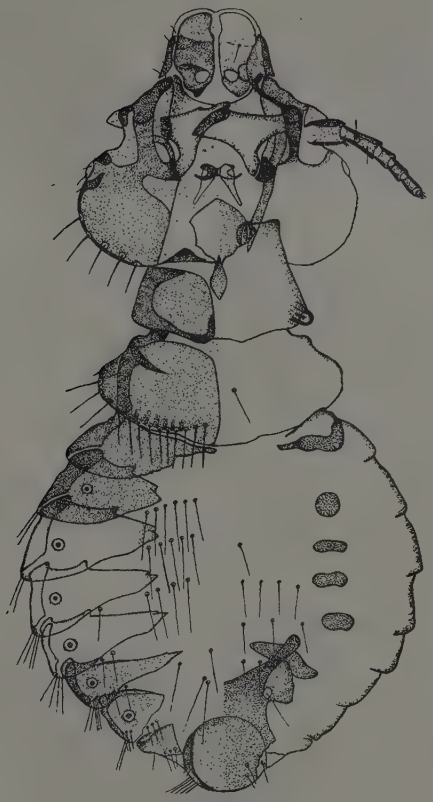


Fig. 1

The male genital armature is unusual, and so complicated that an analysis of its component parts is difficult. In his description of the genitalia of *flavus* Cummings gives interesting details, but I am not convinced that his interpretation of the structure of the paramers and endomeres is entirely correct, but if so, then those of *ajajus* seem to be somewhat different. However, the genitalia of *ajajus* is certainly close to that of *flavus* and *plataleae,* and very different from any other neotropical species I have seen. It seems that this peculiar type of genitalia may be restricted to the species of *Ibidoecus* parasitic on the Spoonbills.

In the female there are but eight *apparent* abdominal segments, IX being reduced to an almost indistinguishable, bilobed protuberance on the broad, short eighth, which has a continuous tergite. The small sternal sclerites present on segments II to VI are almost the same as in the male, except more circular and uniform in size and shape from II to V. The genital plate is large and characteristic. (see fig.)

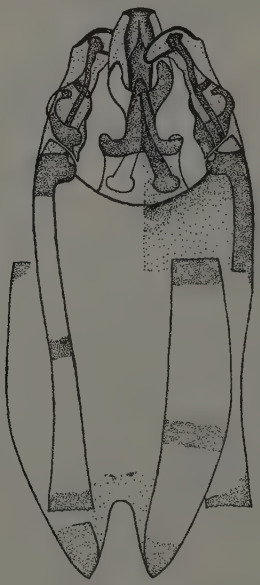


Fig. 2

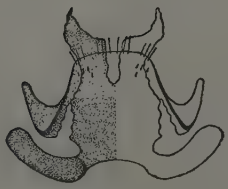


Fig. 3

TABLE OF MEASUREMENTS

Segment	I. plataleae (from Piaget) male		female		I. flavus (From Cummings) male		female		I. ajajus male		female	
	l.	w	l.	w.	l.	w	l.	w.	l.	w.	l.	w.
Body	2.30	—	3.10	—	2.84	—	3.96	—	2.30	—	2.94	—
Head frons	—	—	—	—	—	—	—	—	—	.28	—	.282
Head temples	—	.84	—	.95	—	—	—	—	.807	.89	.825	.976
Head occiput	.64	—	.71	—	—	—	—	—	.795	—	.803	—
Prothorax	.48	—	.60	—	.60	.65	.80	.74	.37	.586	.40	.608
Ptèrothorax		.75		.85	—	.90	—	1.05	.412	.78	.412	.857
Abdomen	1.10	1.15	1.80	1.45	1.28	1.30	2.20	1.85	1.27	1.29	1.62	1.43
Antennae	—	—	.38	—	.49	—	.51	—	.434	—	.39	—
Basal Plate	—	—	—	—	—	—	—	—	.55	.185	—	—
Paramers	—	—	—	—	—	—	—	—	.098	.152	—	—
Penis	—	—	—	—	—	—	—	—	.137	.068	—	—

Ibidoecus bimaculatus (Mjöberg)

Figs. 4 to 7

Docophorus bimaculatus Mjöberg, Ark. für Zool., Band 6, Nº 13, p. 125, figs. 70 to 72 (Host: "Ibis from South America".—equals Guara alba (Linné), *fide.* Carriker.

Ibidoecus bimaculatus (Mjöberg), Cummings, P.Z.S., Dec. 1916, p. 663.

Of the various neotropical species of *Ibidoecus* which I have examined, there is but one which could correspond to Mjöberg's *bimaculatus.* Two ♂♂ and two ♀♀ from *Guara alba* agree very closely in measurements and proportions of head and body, and the male also has the sternal sclerites exactly as shown in Mjöberg's fig. 71, which seems to be a very stable character, differing in the different species. My specimens from *Guara alba* also show rounded sternal spots in the female, under the tergites, in II to VII, in addition to the transverse blotches shown by Mjöberg in VI and VII for *bimaculatus,* which may easily have been overlooked in uncleared specimens. It is not possible to come to any definite conclusion solely from Mjöberg's description and figure (of head), both of which might apply equally well to any one of

several species, but his measurements are *very close* to my specimens from *Guara alba,* while there is nothing in his description which *disagrees* with my specimens, so that it seems best to assign *Guara alba* as the true host of *bimaculatus* (Mjöberg), and redescribe and figure the species on that basis, which I have done.

Diagnosis.—This is one of the commoner type of species which have the apical portion of the bilobed clypeal signature finely lined or "channelled", of which there are now known at least four neotropical forms, viz: *phimosus* n.sp.; *plegadii* n.sp.; *scolopaceus* n.sp.; and the present one. Of the four species, *plegadii* is much the largest and *scolopaceus* much the smallest, with *bimaculatus* and *phimosus* close together and of medium size, with *phimosus* the smaller of the two, but genital armature of the same type. *I. bimaculatus* is easily distinguished from *phimosus* (its closest relative) by the very much larger genitalia (see fig.) and by the very different pattern of the antennal bands, *phimosus* having these bands very heavy and with a pitchy blotch at base of trabeculae, at posterior mandibular condoyle, and narrow band along the occipital margin (broken medially). There are six pustulated hairs on each side of the posterior margin of the pterothorax, extending from lateral angle to half way to median line. In the male the No. I tergite is long, tapering, extending nearly to median line, and with tip curved forward *under* the pterothorax. Segments VIII and IX are similiar in structure to those of *scolopaceus* (see fig.) Small, rounded, sternal sclerites are present under tergites II to VI, while on No. I there is the usual deeply-pigmented, elongated sternite, extending from inner margin of pleurite to a quadrangular plate in middle of segment; a short, slender, transverse sternite lies across median portion of posterior border of pterothorax. (The genital plate is figured by Mjöberg). The sternal abdominal chaetotaxy seems to be similiar to that described and figured by Kellogg for *fissi-signatus,* while the dorsal is very close to that of *scolopaceus.*

Fig. 5

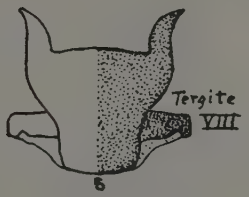


Fig. 3

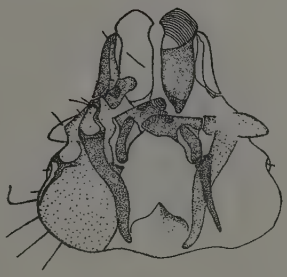


Fig. 4

The male genitalia are similiar in type to those of *scolopaceus, phimosus* and *plegadii,* but differ in size and shape of component parts (see figs.) The whole genital armature (exclusive of basal plate) is larger than in *phimosus* and *scolopaceus,* as long but narrower than in *plegadii,* with narrower and shorter basal plate.

In the female the structure of abdominal segment I is same as in male, while there are the same rounded sternal sclerites (but smaller) on segments II to V and VII, but there is a larger sternite (shape of a shoe-sole) lying diagonally across V and VI; between the posterior portion of these two sternistes lies a narrow tranverse sclerite along anterior edge of VI, while a much wider, transverse band lies along median portion of anterior margin of VII, its ends overlying the two oval sclerites.

Segment IX is obsolete, VIII being short, wide and rounded posteriorly.

Ibidoecus phimosus new species.

Figs. 8 to 10

Types, male and female adults, from *Phimosus infuscatus berlepschi,* Hellmayr, collected by the author at La Gloria, Dept. Magdalena, Colombia, May, 27, 1943 (in U. S. Nat. Mus).

Diagnosis.—This species is strikingly similiar to *bimaculatus* (Mjöb), especially in the shape and size of the head, but in *bimaculatus* the head is longer than wide (.80 x .78) and in *phimosus* wider than long (.716 x .75). In *phimosus* the antennal bands, too, are very different (see figs.) with pitchy blotches at base of trabeculae and at posterior mandibular condoyle, as well as a band along the occiput, while in *bimaculatus* all of the antennal band is faintly pigmented except the inner border and posterior end, where it is fused with the occipital band. The structure and chaetotaxy of the pterothorax is the same as in *bimaculatus* and *scolopaceus,* except that there is a long prong extending inward from the median portion of the lateral band (as in *heterogenitalis* n.sp.).

The male genital armature is nearest to that of *scolopaceus,* but is much smaller (except basal plate longer) and differs in structure of basal portion of basal plate, as well as the penis and paramers (see fig.).

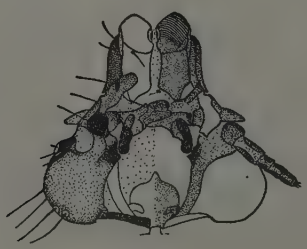


Fig. 8

Fig. 9

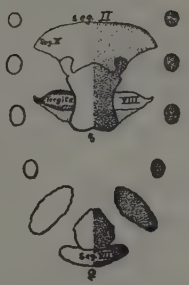


Fig. 10

In the female the sternal plates are the same as in *bimaculatus,* except that in segment VI the median, narrow, transverse sclerite is replaced by a rathr large oval plate, with greater extension longitudinally. The abdominal chaetotaxy is not always clearly discernable, but in this species the female shows very clearly that it is as follows: 1 small hair at angle of II; 4 hairs (dorsal and ventral) at angeles III to VII (one considerably longer and coarser than others); 4 pustulated hairs along the outer half of the posterior portion of tergites IV to VII (just forward of the edge of the posterior tergite which overlaps them); a row of strong, longish hairs across segments I to VI just back of posterior edge of inner third of tergites and thence arching forward slightly across segment to median line. There are also rows of sternal hairs (much shorter and more bristle-like) more or less opposite the above described dorsal hairs, across II to VI,

and in addition, from 2 to 4 hairs of simillíar type under median portion of tergites II to V. In the male the abdominal chaetotaxy seems to be about the same but with somewhat fewer hairs.

Ibidoecus plegadii new species.

Figs. 11 to 13

Types, male and female adults, from *Plegadis ridgwayi* (Allen), collected by the author on Lake Junin, Peru, April 14, 1930 (in coll. of author).

Diagnosis.—This species may be distinguished from all of the other neotropical species (except *ajujus*) by its very large size, there being no other which closely approaches it in this respect. The genitalia are also distinctive, due to their very large size, although of the same type as in *bimaculatus, phimosus* and *scolopaceus,* but from which they differ in having the inner basal margin of the paramers *sharply toothed,* while in the others this margin is simply *scored.*

Fig. 12

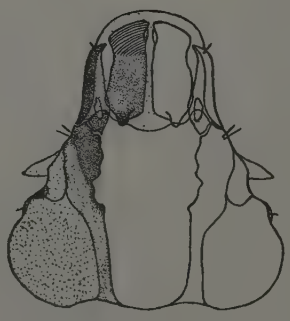


Fig. 11

Like *bimaculatus* it has the head about as long as broad, but very much larger (.95 x .93 against .80 x .78); the clypeal signature is also much longer than wide, like in *scolopaceus* (.347 x .29), while in *heterogenitalis* it is the reverse (.16 x .174).)

TABLE OF MEASUREMENTS

Segment	I. bimaculatus				I. phimosus				I. plegadii			
	male		female		male		female		male		female	
	l.	w.	l.	w.	l.	w.	l.	w.	l.	w.	l.	w.
Body	2.15	—	2.80	—	1.92	—	2.36	—	—	—	—	—
Head frons	—	.303	—	.303	—	.282	—	.282	—	—	—	—
Head temples	.78	.792	.90	.93	.705	.75	.738	.803	—	—	—	—
Head occiput	.80	—	.92	—	.735	—	.77	—	—	—	—	—
Prothorax	.282	.488	.337	.50	.303	.445	.293	.458	—	—	—	—
Pterothorax	.282	.64	.37	.727	.30	.553	.282	.608	—	—	—	—
Abdomen	.976	.965	1.52	1.26	.89	.933	1.28	1.01	—	—	—	—
Antennae	.326	—	.326	—	.326	—	.314	—	—	—	—	—
Basal Plate	.39	.108	—	—	.347	.11	—	—	—	—	—	—
Paramers	.217	.087	—	—	.138	.061	—	—	—	—	—	—
Penis	.173	.05	—	—	.123	.035	—	—	—	—	—	—

Ibidoecus fissi-signatus (Kellog & Paine)

Docophorus fissi-signatus Kellog & Paine, Ent. News, Vol. XXII, Jan. 1911, p. 19, fig 1 (♀) (Host: "Desert Curlew", Lagunillas, Bolivia (Equals: *Theristicus branickii* Berl. Stolz. fide G. H. E. Hopkins)

I have two males of an *Ibidoecus* taken on *Theristicus caudatus*, near Reyes, Rio Beni, Bolivia which are, apparently, very close to *fissi-signatus*. The species was described from the female, with male unknown, so that it is not possible to make an adequate comparison between the description and figure of *fissi-signatus* and the two Rio Beni males. However, I find, in my study of this genus, that there is very little difference in the sexes in body structure except in abdominal segments VIII and IX, the genital plates and sternel sclerites. The shape of the clyppeal signature is an excellent specific character, and the shape of the anterior ends of these sclerites in *fissi-signatus* (and my two males) is unique among the neotropical species of the genus. These two males from *T. caudatus* have the signature shaped much as in *fissi-signatus*,

as far as can be told by the somewhat vague outline given in the figure of the female of that species. The male genitalia would decide the question immediately, but unfortunetely the male of *fissi-signatus* is unknown.

Undoubtedly the two males from *T. caudatus* are closely related to *fissi-signatus*, with the same class of clypeal signature, same thoracic structure and chaetotaxy, and probably the same type of male genitalia, and possibly they will prove to be conspecific when males are available from *T. branickii* for study, but I prefer to keep the two specically distinct for the time being. This resolve is strengthened by finding two very distinct subspecies of *Ibidoecus* on two subspecies of *Aramus scolopaceus*, one from Bolivia, the other from Colombia.

For the present I can add nothing to Kellogg and Paine's description and figure of *I. fissi-signatus*.

Ibidoecus heterogenitalis new species.

Figs. 14 to 16

Type, male adult, from *Theristicus caudatus* (Boddaert), collected by the author at Chatarona (near Reyes), Beni, Bolivia, Sept. 22, 1934 (in coll. of author).

Diagnosis.—Apparently closely related to *fissi-signatus* (Kell & Paine), having the same type of clypeal signature and shape of head and thorax. The signatures are short and wide, with apical ends very flatly convex, longer on the inner side, and sloping sharply backward to outer side (see fig.), with a darker, narrow frontal margin; deeply pigmented, pointed basal ends, and the whole sclerite almost uniformly pigmented, and without trace of lines on apical portion. The signatures are attached not only at their pointed bases, but also on the outer edge, where the sternal portion of the clypeal band extends under them, and with this extension anchored to the head proper by a narrow, dark colored strip of chitin (see fig.).

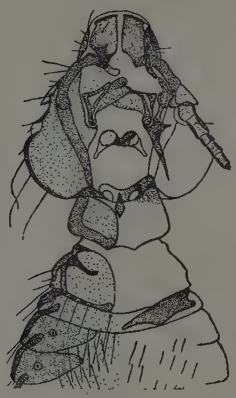


Fig. 14

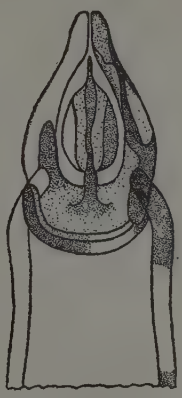


Fig. 15

The antennal bands extend forward to clypeal suture, then bend inward and end at basal tip of clypeal signatures; the occipital bands are continuous and are fused to the ends of the antennal bands. An extension from the posterior mandibular condoyle forms another prominent band extending diagonally backward and outward, under the occipital band (which is dorsal), ending in a slender point at side of antero-lateral angle of prothorax. The pharyngeal sclerite is of a distinct type, differing decidedly from that of the *ajajus flavus-plataleae* group.

The prothorax is small, quadrangular, with slightly divergent sides, and with a wide, deeply pigmented marginal band extending around on the posterior margin almost to the median line. No hair or spine at angle. Pterothorax also small, but little longer than the prothorax, with divergent, sinuate sides and rather strongly convex posterior margin; three short hairs at each side (at the wide, flattened angle) and 5 pustulated hairs on each side of porterior margin, but not reaching much more than half way to middle line.

Abdomen small, almost round, with well developed pleurites and tergites; pleurites narrow, very deeply pigmented and with heads projecting far under succeeding segment. The tergites are fused to pleurites, occupying the entire width of segement at junction with pleurite (but do not overlap each other), then taper to a round point inwardly;

they are uniformly pigmented, but much less deeply than the pleurites. Spiracles set in large hyaline pustules in tergites II to VII. Segment VIII small, divided by IX, which extends some distance inside of VIII.

The chaetotaxy is somewhat complicated, and as follows: One short hair at angle of II;3 long hairs at angle of III, and 4 at IV to VII. Row of 5 strong hairs in clear space between tergites II and III, and III and IV;4 between IV and V; 3 between V and VI; 2 between VI and VII. The hairs are unusually long, both at angles and between tergites. A cluster of slender hairs at each side of IX. On sternal surface there are two short, but coarse hairs under median, posterior portion of tergite II;4 under III and IV; 2 under V and VI, and 1 between VI and VII (these hairs are all pustulated). Two sternal hairs, short and fine, between 2nd. pair of coxae; 6 between 3rd. coxae, also 2 longer hairs on each side of median line on segments, II to VI.

The male genitalia are somewhat complicated, and entirely different from all the other species treated in this paper (as far as known). It was not possible to clearly differentiate all the parts, but the figure is approximately correct, and gives a better idea of the structure than would a long description.

Briefly, *heterogenitalis* differs from *fissi-signatus* (as far as can be told from the opposite sexes) in having narrower pro and pterothorax, and in the chaetotaxy of the abdomen, the latter being very different, according to both description and figure of *fissi-signatus;* the occipital margin is more sinuate.

In segment I of abdomen there are strongly chitinized and deeply pigmentd sternites which almost meet medially (see fig). At first glance these sclerites seem to be tergites, but careful focussing shows them to be ventral. Apparantly this character is present in most, or all species of the genus, and is probably of generic significance.

Ibidoecus scolopaceus scolopaceus new subspecies.

Figs. 17 to 19

Type, male and female adults from *Aramus s. scolopaceus* (Gemlin), collected by the author at La Esperanza (near Codazzi) Dept. Magdalena, Colombia, Aug. 3, 1942 (in U.S. Nat. Mus.)

Diagnosis.—This is the smallest of the known neotropical forms, with a long narrow clypeus, the signature being actually slightly longer than in *phimosus,* and almost as long as in *bimaculatus.* Excepting for the pitchy spots on antennal bands and the pitchy occipital bar, the head structure and pigmentation is very similiar to that of *phimosus,* although a careful comparison of the figures of each will show many small differences, especially in the shape of the clypeal signature, its method of attachment to head proper, and in the size and shape of the mandibles.

Fig. 17

Fig. 18

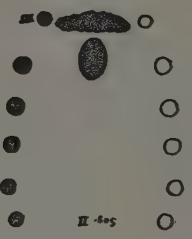


Fig. 19

The prothorax has rounded, divergent sides, while in *phimosus* they are almost straight (but divergent). Pterothorax and abdominal structure very similiar to that of *phimosus,* with the abdomen in male almost circular (.78 x .74) and very small. All of the males have the abdominal segments drawn tightly together, with the tergites strongly overlapping, but this seems to be the normal condition.

The female has the abdomen oval (1.24 x 1.02); the sternal sclerites are as shown in the figure of the male. In the female the lateral sclerites (under the tergites) seem to be the same as in the male, but the transverse, median sternites are wide and deeply pigmented, the first extending from tip to tip of tergite VI, and the second extending under the ends of tergites VII. The chaetotaxy seems to be the same as shown in figure of male.

The male genital armature is large for size of insect, much larger than that of *phimosus,* with shorter, wider basal

plate, and long, narrow working parts, with very long penis, while the stucture of the basal plate is also unique for the genus.

Ibidoecus sclolopaceus caraui new subspecies.

Fig. 20 and 21

Types, male and female adults, from *Aramus scolopaceus carau* Vieillot, collected by the author at Chatarona (near Reyes), Rio Beni, Bolivia, Sept. 22. 1934 (in coll. author).

Diagnosis.—Very similiar to *scolopaceus,* from which it differs principally as follows: Head smaller in all proportions, but clypeal signature proportionately longer; the antennal bands are differently shaped, while the attachment of the clypeal signature to the head is slightly different; the prothorax has straighter, more divergent sides, with bands along posterior margin less sinuate; the pterothorax; and

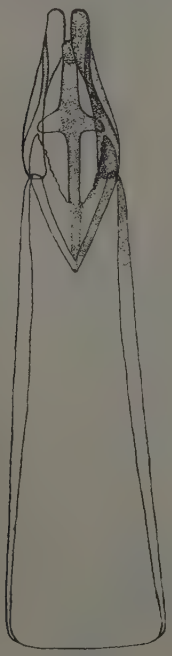


Fig. 21

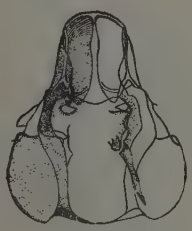


Fig. 20

abdomen seem to be practically the same, the latter being quite round in male (.75 x .74). There is apparently considerable difference in the genital armature of the males, although I am not positive that the figure is correct in all details, since the male type (and only ♂), while having the genitalia extruded nearly to the basal plate, has that organ somewhat twisted. I think that the thick, lateral wings of the penis should be more recurved, as in *scolopaceus*, with the apical portion also similiarly shaped. However, the size and shape of cognition of the form, together with the other differences given above.

TABLE OF MEASUREMENTS

Segment	I. fissi-signatus		I. hetero-genitalis		I. s. scolopaceus				I. scolopaceus caraui			
	male		female		male		female		male		female	
	l.	w.	l.	w.	l.	w.	l.	w.	l.	w.	l.	w.
Body	2.40	—	1.56	—	1.56	—	2.21	—	1.58	—	2.04	—
Head: frons	—	—	—	.195	—	.195	—	.239	—	.195	—	.25
Head: temples	—	.68	.58	.608	.655	.615	.77	.74	.64	.58	.738	.70
Head: occiput	.66	—	.586	—	.66	—	.76	—	—	—	—	—
Prothorax	.40	—	.206	.326	.228	.39	.28	.456	.15	.37	.19	.43
Pterothorax		—	.24	.445	.19	.456	.26	.542	.17	.43	.22	.56
Abdomen	—	1.06	.738	.694	.70	.75	1.14	.976	.74	.74	1.08	.89
Antennae	—	—	.27	—	.24	—	.26	—	.26	—	.27	—
Basal Plate	—	—	.50	.15	.303	.12	—	—	.28	.108	—	—
Paramers	—	—	.14	.13	.19	.067	—	—	.14	.085	—	—
Penis	—	—	.112	.043	.162	.036	—	—	.128	.05	—	—

Note: I have a single female from *Aramus scolopaceus dolusus* Peters, collected at Tres Zapotes, Vera Cruz, México, which for lack of male genitalia I have tentatively called *I. s. sclolopaceus*. When male is available it may prove to be subspecifically distinct.

Cummingsiella testudinaria (Denny) and *C. longirostricola* Wilson.

Figs. 22 to 25.

Docophorus testudinarius Denny, Anopl. Brit., 1840, p. 96, pl. I, fig 6 *(Numenius arquatus) Philopterus (Cummingsiella) longirostricola* Wilson, Canadian Entomologist., Dec. 1937, p. 264; figs. 1 and 2 *(Numenius americanus)*.

In 1941 I collected specimens of *Cummingsiella* from *Numenius americanus* at Tlacotalpam, Vera Cruz, Mexico, and the following year had a description of it in MS., together with drawings of the new form and of *C. testudinaria* (Denny). Fortunately, before publishing them Wilson's description of *longirostricola* came to my attention.

However, since Wilson does not figure either head or genitalia of *testudinaria,* and gives rather poor figures of the new form, I have thought it advisable to publish my own drawings, in order to give a clearer picture of the differences between the two species.

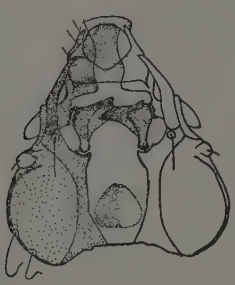


Fig. 23

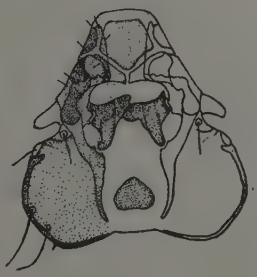


Fig. 22

Fig. 24

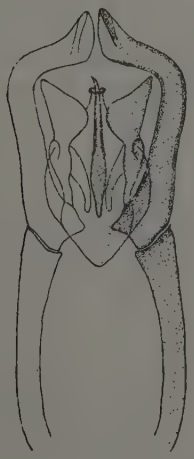


Fig. 25

As may be seen from the drawings, the clypeal area of *longirostricola* is much narrower, with the signature differently shaped, while the antennal bands also differ decidedly in shape and structure; the occipital bands are entire, widening strongly on the occipital margin; the trabeculae are also differently shaped. The most striking difference, however, is in the male genitalia, not only in size, but in structure of the component parts, all of which differ in either size or shape, or both (see figs.).

Multicola macrocephala (Kellogg)

Lipeurus macrocephalus Kellogg, New Mall. II, p. 504, Proc. Cal. Acad. Sci. 2nd. Ser., vol. VI, Nov. 7, 1896 (Host: *Chordeiles virginianus henryi;* equals *C. minor henryi* Cassin)

I recently examined a female cotype of this species in the U. S. National Museum collection, and found it to be a typical *Multicola,* and the first recording of that genus in the New World. This species was overlooked by Miss Clay when she described the genus, and also by myself when I published descriptions of new species of that genus from Colombia and Bolivia (Revista Venezolana de Entomologia, Dec. 31, 1945, p. 173 to 181: Neotropical Miscel. Nº 1).

When describing the species Kellogg recognized its affinity with *Lipeurus hypoleucus* Nitzsch (genotype of *Multicola*) and compares the two forms. Oddly enough he had no males of the species either, but I was able to secure males of all the new South American forms.

CORRECTIONS OF ERRATA IN "A CATALOGUE OF THE HESPERIOIDEA OF VENEZUELA"

BY

Ernest L. Bell

This Catalogue contains a large number of typographical errors due to the author having had no opportunity to correct a galley proof. Corrections of the major errors are given below.

Page 67 First line of the last paragraph, read subfamilies for families.

" 69 Read PYRRHOPYGE PROCULUS Hopffer.

" 72 Read AMENIS SIMILIS Roeber.

" 75 Read MYSCELUS PHORONIS (Hewitson).

" 76 Read Genus PHOCIDES Huebner
Diatype PHOCIDES CRUENTUS Huebner.
(PAPILIO PALEMON Cramer 1777, not.
PAPILIO PALAEMON Pallas, 1771).

" 77 Under genus *Urbanus* Huebner, read 1832. *Eudamus* Swainson, Zool. III., etc.

" 80 Under *Urbanus doryssus* (Swainson) read 1832. *Eudamus doryssus* Swainson, Zool. III., etc.
Under *Urbanus virescens* (Mabille), second line, read XXXIX for 39.

" 81 Under URBANUS EURYCLES (Latreille), sixth line delete the V after Nov. Lep.

" 83 Under genus ASTRAPTES Huebner, fifth line, read Genera for General.

Page 86 Under ASTRAPTES HOPFFERI (Ploetz), delete the entire reference to *Telegonus mithras* Mabille and substitute 1882. *Eudamus hopfferi* Ploetz, Stett. Ent. Zeit., xliii, p. 90. South America.

" 90 Under TELEMIADES AMPHION (Geyer), fifth line, read *antiope* for *anthiope*. The entire reference should be deleted as *antiope* Ploetz proves to be a distinct species.

" 94 Under AUTOCHTON ZAREX Huebner, seventh and eighth lines, read (not *Papilio brontes* Schiffermuller & Denis, 1775) instead of (not *Papilio brontes* Huebner, 1776). And on the eleventh line read *orontes* instead of *orantes*.

" 95 Read AUTOCHTON ZONILIS (Mabille).

" 98 Under HYDRAENOMIA CLITO (Fabricius), sixth line, read congeneric for conspecific.

" 102 Under ARTEUROTIA TRACTIPENNIS Butler & Druce, sixth line, read fig. 1 genitalia.

" 106 Under PELLICIA BESSUS' MOESCHLER, sixth line, deleted c after 174b.

" 107 Under PELLICIA POLYCTOR (Prittwitz), first line, read (*polyotor*) instead of (*polyctor*).

" 108 Under genus MYCTERIS Mabille, insert Haplotype MYCTERIS CAERULA Mabille.

" 110 Under ECHELATUS SIMPLICIOR (Moeschler), insert fig. before 27.

" 111 Fourth line from top, read p. 885.
Under GRAIS STIGMATICUS (Mabille), first and fourth lines, read *stigmaticus* for *sitgmaticus* and *stimaticus*.

" 114 Under CARRHENES CHAEREMON (Mabiille), first line, read xxxv for xxv.

" 115 Under OULEUS FRIDERICUS (Geyer), second line, read figs. 611, 612. Seventh line, read COELIGINEA for COELIGINAE.

Page 118 Under genus ACHYLODES Huebner, next to last line, delete "of the under side".

" 124 Under ANISOCHORIA PEDALIODINA (Butler), delete the entire reference to *Helias pyralina* Moeschler and substitute 1870. *Helias pedaliodina* Butler, Trans. Ent. Soc. London, p. 518.

" 125 Under genus PHOLISORA SCUDDER, fifth line, delete *Achlyodes* at the end of this line.

" 126 Under PHOLISORA CUPREICEPS Mabille, first line, delete the D at the end of this line.

" 130 Read PYRGUS DOMICELLA (Erichson).

" 136 Under ANCYLOXYPHA XANTHINA Mabille,, first line, insert xxv, before C. R.

" 137 Under genus HYLEPHILA Billberg, first line, read PHYLEUS instead of PHYLAEUS.
Fourth line, read *phyleus* for *phylaeus*.
Read HYLEPHILA PHYLEUS (Drury) and the line below it *phyleus* Drury.

" 138 Under POLITES VIBEX (Geyer), first line, read *vibex instead* of *ribex*.

" 141 Under ZARIASPES MYS (Huebner), sixth line, add 93 after pl.

" 145 Under PANOQUINA VALA (Mabille), delete VALA Mabille and substitute NYCTELIUS (Latreille).

" 147 Under THESPIEUS DALMAN (Latreille), first line, read *dalman* instead of *dalmani*.

" 148 Under VACERRA LITANA (Hewitson), seventh line, read figs. 3 - 5, etc.

" 149 Under VACERRA EGLA (Hewitson), fourth line, insert figs. between 97 and 9.

" 150 Under OXYNTHES CORUSCA (Herrich-Schaeffer), third line, read *Hesperia* instead of *Hespperia*.

" 151 Read RHINTHON CABELLA (Ploetz), and the fourth line below it, read *Rhinthon*.
Read RHINTHON CYNEA (Hewitson).

Page 152 Read RHINTHON MELIUS (Geyer).
Under COBALUS CANNAE Herrich-Schaeffer, sixth line, delete 325.

" 160 Delete the twenty-third and twenty-fourth lines 1924. *Moeris striga*, Draudt, etc., and substitute 1924. *Lerema parumpunctata*, Draudt, Seitz Macrolep. of the World, v, p. 967, pl. 187c.

" 161 Under METRON CHRYSOGASTRA (Butler), eighth line, read *chrysogaster* for *chrysogastra*.

" 162 Under METROCLES AMBROSEI (Weeks), second line, read *ambrosei* instead of *amborosei*.

" 171 Read PARACARYSTUS HYPARGYRA (Herrich-Schaeffer).
Under genus ZENIS Godman, second line, read 585 instead of 588.

" 172 Under VETTIUS LAFRENAYE (Latreille), fourth line, read *aloeus* instead of *alocus*.

" 175 Under EUTOCUS LUCIA (Capronnier), first line, read Capronnier instead of Caprionnier.

" 183 Under PERICHARES PHOCION (Fabricius), first line, read Ent. Syst. iii instead of ii.
Under PERICHARES LOTUS (Butler), insert as the next line 1870. *Telegonus lotus* Butler, Trans. Ent. Soc. London. p 495. Venezuela.

" 184 Under TALIDES SINON (Cramer), first line, read figs. D. E. Surinam. Fourth line, read (*sergestus* auct. not. Cramer).

" 186 Under Bell, last line, insert lviii, 1932 after 1930.

" 187 Under Butler & Druce, read Butler instead of Buttler.
Under Clerck, read C. A. instead of G. A.
Under Dodge, read G. M. instead of G. G. M.
Under Dognin, read vol. ii instead of x.

Page 192 Between Schaus and Schrank insert Schiffermuller (I) & Denis (J. N. C. M.) Systematisches Verzeichniss der Schmetterlinge der Wienergedend, 1775. Under Skinner (H) & Williams (R. C. Jr.(read 1, 1924 instead of i, 1924.

" 194 Third column, fifth line, read *Argopteron* instead of *Areopteron.*

" 195 Second column, after *caepio* insert *caerula* 108.

" 196 Second column, read *draudti* instead of *drauti.*

" 198 Second column, read *lacydus* instead of *lacidus.*

" 199 Second column, read *neaeris* instead of *naeris.*
Third column, read *ocrinus* instead of *ochrinus.*

" 200 First column, read *oenander* instead of *onander; orontes* instead *orantes.*
Third column, read *phthia* instead of *phtia.*

" 201 First column, read *Pterygospidea* for *Pterydospidea*
Third column, read *schrottkyi* instead of *schrotlkyi*
sordidulus instead of *sordidula.*

" 202 Second column, insert *Thymale* 133 after *thyestes* 105; after *tortricinus* change 124 to 121, 122.

LOWER ORINOCO RIVER FUNGUS-GROWING ANTS (HYMENOPTERA: FORMICIDAE, ATTINI)

BY

Neal A. Weber

Very little has appeared on the ants of the Orinoco River and still less on the fungus-growers. The author has previously published description of several new Attini from here. Biological observation made on these and others, however, remained largely unpublished and appear in this paper. They were made in January-February 1935 while on an expedition to this most interesting region and, because of lack of time for much collecting, represent only part of the fauna to be expected. Several observations on *Acromyrmex octospinosus* from elsewhere in Venezuela are included.

The genera of Attini are listed below beginning with the most primitive, *Cyphomyrmex,* and ending with the most advanced, *Atta.* Species which were not taken, but which will likely be discovered in the future are mentioned.

The area dealt with includes the river banks from Ciudad Bolivar down to, and through, the Delta. Because of the periodic flooding of much of the Delta from the tides, these predominantly terrestrial ants have had to make some adjustments. Doubtless some of the smaller species will be found nesting among epiphytic rootlets and in other places above ground in trees.

CYPHOMYRMEX

Only the species *rimosus* was taken along the river in the limited time available but there are likely other species. *C. bigibbosus* Emery or some form of it may be expected in the rain forest, nesting under or in rotted logs.

Cyphomyrmex rimosus Spinola

This species, most widespread of all fungus-growers, is probably of general occurrence in the entire Orinoco basin as well as in all Venezuela. The ants, however, are generally overlooked because of their small size (about 2 mm.), dull brown color and slow-moving habit. When alarmed they "feign death" readily and are then almost impossible to see.

A colony was examined at Barrancas at the head of the Delta, inland from the lagoon west of the village. The ants nested in sandy soil beside the base of a wooden post 85 mm. in diameter and also used tunnels in the post made by termites. The soil chambers were irregular and collapsed in excavating the loose soil. The site was shady and the base of the post was never exposed to more than patches of sunlight up to noon. The ant chambers were on the east side. Several score workers, pupae, larvae and a female were in the portion of the colony collected. A mite was taken in the soil about or in a chamber.

Another colony at Barrancas nested beside a colony of *Acromyrmex octospinosus*. The latter nested in soil close to a rotted stump while the *Cyphomyrmex* nested both in the stump and in a curled up piece of palm or maize leaf buried about 50 mm. in the soil about the *Acromyrmex* nest. Brood was in the dead leaf, as also in chambers in the rotted wood itself. The ants used, as substrate for their fungus, feces of several sizes apparently caterpillar, which were not ribbed as is often the case. The fungus was in the form of small bromatia scattered over the surface of the feces. When the nest was disturbed a small *Pheidole* immediately started to carry off the brood. In the protion of the colony which was collected were 221 workers and much worker brood, specially pupae. Many of the workers were callow as though they were a recent hatch of pupuae maturing at about the same time. Since this was the dry season it may well be that during this period workers were produced, while shortly before the rainy season sexual brood may mature. No queen was taken and it is probable that there were several with enough additional workes to bring the adult population to about 300.

The two nests of fungus-growers, while close together, were unconnected although foraging workers of each must have continually passed by the nest of the other.

Cyphomyrmex rimosus curiapensis Weber

Cyphomyrmex rimosus Spinola *curiapensis,* Weber, Rev. Ent., 9: 190-191,1938 ♀ ♀ ♂, *loc. cit.* 11: 411, Figs. 6, 8, 9, 1940, ♀ ♂, *loc. cit.,* 12: 401, 1941, *loc. cit,* 17: 119-120, 1946, ♀.

Curiapensis is a comparatively large and coarsely tuberculate form. The type locality is the village of Curiapo on Isla Curiapo in the Orinoco Delta. It is also recorded from British Guiana.

The type colony was associated with one of the far larger fungus-grower, *Acromyrmex octospinosus,* in irregular cavities in the trunk of a tree. The *Cyphomyrmex* nested about 15 cm. above the larger ants whose nest itself extended about 75 cm. above the ground. The smaller ants were using spaces in humus and general debris between the outer and inner leaves at the base of an epiphyte. In the portion of the colony collected were 90 workers, five alate females and seven males, in addition to brood. It is probable that the colony amounted to nearer 200 adults than 100.

Associated with the *Cyphomyrmex* was a nest of the tiny myrmicine ant, *Wasmannia auropunctata* Roger whose chambers must have anastomosed with those of the other ant. They were probably not hostile. A small *Pheidole* nested here. Also there were eggs and young of a small centipede and workers of the following ants: *Crematogaster, Leptothorax, Cryptocerus, Pseudomyrma, Paratrechina longicornis* Latr. and *Nylanderia.* A few small red-brown Hemiptera with spiny legs collected with the *Cyphomyrmex* may have been myrmecophilous. The termite, *Mirotermes* (M.) *mediocu-latus* Emerson (det. Emerson) ocurred about the nests of both fungus- growers as did sowbugs and small snails.

Cyphomyrmex rimosus venezuelensis Weber

Cyphomyrmex rimosus Spinola *venezuelensis,* Weber, Rev. Ent., 9: 188-189, 1938, ♀, *loc. cit.,* 11: 411, Fig. 5, 1940, ♀.

Venezuelensis is of average size and therefore is smaller than *curiapensis*. The type locality is a few miles downstream from Ciudad Bolivar.

The ants nested under an old log on the moist sand on the edge of the Orinoco beach, a site probably just above high water level since cacti were growing nearby. The general area was characterized by mesophytic to somewhat xerophytic vegetation.

The nest was a Y-shaped depression in the sand with a maximum length of 90 mm. and breadth at the forking of 40 mm. The depression was excavated deeper in some places than in others. In the most shallow was the brood, kept separate from the funges garden. The latter appeared to be developed on insect cylindrical, ribbed excrement. There were also heads of a termite, *Nasutitermes (N.)* sp. and other insect carcasses. In the portion of the colony which was collected were 175 workers and, since no female was taken, the colony probably consisted of at least 200 adults. With the brood were what appeared to be Hymenopterous semi-pupae with bead-like 12 segmented antennae which may have been myrmecophilous. These were somewhat larger than the ant semi-pupae.

MYCOCEPURUS

Representatives of this small and spiny genus were not taken but may well occur along the river. The ants are most inconspicuous and nest in clay soil. They may be discovered by looking for tiny heaps of soil grains after rains, when they may be re-opening their nests. *M. smithi* Forel may be the species here.

MYRMICOCRYPTA

Species of this small and inconspicuous genus doubtless will be discovered along the lower Orinoco. The ants appear more adaptable than those of *Mycocepurus* and may be found nesting in clay soil, in humus or in rotted wood of standing trees or wood on the ground. Among the species which may occur here are *M. buenzlii* Borgmeier, *M. spinosa* Weber and undescribed species, *M. urichi* Weber was taken by Dr. P. Hummelinck on Isla Margarita.

APTEROSTIGMA

Several species of this smooth and hairy genus are sure to turn up here, *A. mayri* and *urichi* Forel especially but also possibly *wasmanni* Forel and several described by myself. The ants nest in humus or in rotted wood in rain forests as a rule. They are hard to see, since they remain motionoless at the least disturbance and are humus-colored.

SERICOMYRMEX

The ants of this genus are covered with silky, often copper-colored, hairs but are tuberculate or spinose instead of smooth as in *Apterostigma. S. harekulli* or *wheeleri* Weber may be found nesting in clay soil, also *impexus* Wheeler and *urichi* Forel.

TRACHYMYRMEX

The ants of this genus are generally spiny and some may approach those of *Acromyrmex* in size and appearance although others are only 2 mm. long. The species are monomorphic and this character alone conveniently serves to separate a large species from an acromyrmex. One of the largerst ocurs in Venezula, *urichi,* and was originally described from nearby Trinidad, B. W. I. Another species which may occur along the Orinoco is *cornetzi* Forel and other species will likely be found. The small rain forest species nest in clay soil and are as inconspicuous as species of the preceding genera. Externally the nest may be indicated by a crater or turret of clay.

Trachymyrmex urichi Forel

This Trinidad species shows considerable adaptability in nesting habits and may nest in both forest and savannah or llanos areas. It is soil inhabiting, commonly in clay, and often has the usual crater entrance erected in the form of a turret.

About three kilometers north of Soledad, the village across the river from Ciudad Bolivar, the ants were found

along a small stream, a tributary of the Rio La Peña. Though on the llanos, the stream vegetation was declared by my ecologist companion to be more like that around the Mt. St. Benedict Monnastery in Trinidad, B. W. I. than typical xerophytic to mesophytic llanos vegetation. On the llanos proper, nearby, was a nest of *Atta laevigata.*

The ants had formed a turret nest entrance, beneath which a chamber containing large (9mm.) elliptical seeds was found at a depth of about 20 cm. from the top of the turret and below the first chamber was a second which contained the fungus garden. This chamber was elliptical, about 6 cm. high and 7 x 5 cm. in diameters. The substrate for the garden appeared to be partly the seeds of the kind in the first chamber, which seemed to have come from a climbing vine with moderate-sized entire leaves on a nearby tree. The rest of the substrate was a miscellany of vegetal material of small particles, partly wood. In the garden was brood, of which a few larvae were collected. These had a smooth integument with sparse hairs about the head, which contrasted markedly with the coarse, multifid hairs on a short, stout "trunk" of *Acromyrmex octospinosus* larvae, often to be found in nests near the *Trachymyrmex.*

Near Barrancas, at the head of the Delta, stray workers were found under a loose pile of moist twigs on damp soil where they may have been foraging for substrate.

ACROMYRMEX

The ants of the genus *Acromyrmex* resemble those of the genus *Atta,* commonly known as "bachacos" in Venezuela, and may locally be referred to as the small "bachacos". They lack the distinctive soldier caste, however, and are smaller in maxima worker size as well as in numbers of individuals in a nest or in total nest size.

Two subgenera of *Acromyrmex* occur in Venezuela, *Acromyrmex,* s. str., and *Moellerius,* taken near Ciudad Bolivar on the Orinoco, which is llanos-inhabiting and may be expected to be widespread in this habitat in the country. The two species *of Acromyrmex, s. str.* taken along the Lower

Orinoco are also of wide distribution but in a rain forest habitat. One, *A. hystrix,* is characteristic of Guiana in the broad sense (Orinoco Delta to the Amazon Delta), the other, *octospinosus,* is more widespread (Mexico to the Amazon)

A third species of *Acromyrmex,* s. str., *coronatus globuculis* Forel, may occur in the Delta.

Acromyrmex (s. str.) *histrix* Latr.

Both in the Delta and in British Guiana this species nests above the ground (Weber, 1946, p. 153-154). In British Guiana, however, the localities were never flood ed as they were in the Delta.

Two nests were examined along the Caños Horobuku (=Jorobuku), a tributary of the Rio Araturi, southeast of Curiapo in the Delta. One nest was at the mouth of the caños, the other about four miles upstream. Both were in magnificent swamp rain forest and in sites which were flooded at high tide. The ants consequently had to nest above the ground but were always able to forage by crawling over fallen palms and herbs which were not submerged.

One nest was in a mound formed by debris collecting at the base of a clump of palms and my photograph was used in the Wheeler 1937 book (Pl. II, right fig.). Fungus gardens extended under nearly the entire mass of the mound and the total bulk of the numerous gardens must have approximated at least one bushel (30 liters). The base of the mound exceeded a meter in diameter. Though this area was daily flooded by the tide, water came up only to the base of the mound. .*Azteca* ants were dominant arboreal insects in this predominately arboreal fauna and were found everywhere, forming carton nests under *Montrichardia, Ficus* and other leaves, frequently over water, and tending coccids (Lecanid) on many plants, including *Phyllodendron* leaf petioles. The *Acromyrmex* must have had to forage over the *Azteca*-controlled plants but were probably tolerated.

The other nest was at a height of about two meters in a mass of moss-covered moots and humus between ewo *Manicaria* palm trunks which were standing close together. A single fungus garden, about 165 mm. high and 102 mm. broad, was

found and was dissected without finding a queen. Pupae, both large and small, were covered with an open, irregular mesh of mycelium while the larvae lacked this. The larvae were covered with short, stout hairs which tapered to a fine point that was sometimes finely divided. Occasional hairs were bifid or trifid down to the base. The mandibles were stout, triangular with an acute apical tooth, and were finely spinulose. The fragments of the garden were placed on a large leaf on the ground. The ants immediately started to take them back to the nest site and kept at this activity until long after dark (after 7:30 p.m.). By 6 o'clock the next morning they had removed all of the garden fragments to a point above the former site between the palm trunks. They were active during a light rain at this hour. By the late afternoon a fine new fungus garden had been formed in back, of and slightly above, the cavity left by the former garden. Since the relative humidity during this 24-hour period must have always approximated 100% there was no danger of dessication of the delicate fungus. The experiment demostrated also that the ants do not necessarily have to weed out alien fungi as has generally been assumed. This was manifestly impossible under the present conditions. My belief is that the chemical environment created by the malaxated substrate and the ant fecal droplets favors the particular fungus grown by the ants (see Weber, 1945, 1946).

Acromyrmex (s. str.) *octospinosus* (Reich)

This is the species of *Acromyrmex* found in Trinidad, B. W. I. and an account of its biology, including that of an unprecedented intersex colony, may be found in Wheeler, 1937 and Weber, 1945. It seems to be the commonest species of the genus along the Venezuelan littoral.

A colony near Barrancas at the head of the Delta nested close to a *Cyphomyrmex rimosus* colony, described above. The *Acromyrmex* nested in soil close to a rotted stump. The ants had been actively excavating in the soil as shown by a fresh ridge of soil particles about 250 mm. long. At a depth of about 60 mm. a fungus garden was exposed but time was lacking for further observations. The garden was normal in

appearance and the whole situation resembled that of the usual Trinidad nest. While collecting the *Cyphomyrmex* the other ants removed much of their brood to some chamber at a greater depth which must have been connected with the first by a small tunnel. The ants were aggressive and bit the skin. The larger workers were covered with a whitish bloom on the thorax. Several larvae that were collected were conspicuously pilose, the hairs somewhat resembling stout, short palm trees in having a thick, short trunk, multifid above. These divisions were compound in some and the total divisions on half a circumference sometimes were six in number. These larvae therefore differed from the *A. hystrix* larvae in having thicker, shorter and more divided hairs. Mandibles were generally similar, being short, thick, triangular with acute apical tooth, and finely spinulose.

The surrounding vegetation was mesophytic and on the ground or in low bushes were lizards (*Ameiva a. praesignis* and *Cnemidophophorus l. lemniscatus*, det, Shreve) which may well have preyed on the ants.

A colony at the village of Curiapo on Isla Curiapo in the Delta nested in the spaces between buttress roots above the ground. The ants necessarily had to nest above the ground in this area since it was inundated half the year (the rainy seasons) and during the remainder inundated by the daily tides. This specific site seemed to be above the dry season tides, however, so that there was soil continually exposed to the air.

At the base of the tree was a crater of soil and humus from the excavations of the ants. Directly above this, between the butteress roots, was the entrance to one part of the nest at a height of 61 cm. A chamber here, containing a fungus garden, was about 16 cm. high x 13 cm. wide. 5 cm. to one side, on the other side of a root, was another chamber with a garden 15 cm. high x 6.5 cm. wide. There was a third chamber on the opposite side of the trunk and above the other two. A hard carton termite nest *(Mirotermes (M.) mediocultatus* Emreson) was beside the second chamber.

The fungus garden was gray on the outside, brown internally as in *Atta cephalotes* gardens of this region.

Brief observations were made in this species in three other localities in Venezuela: Caracas, Macuto near La Guaira and Puerto Cabello.

On a shaded hillside in Caracas May 11, 1936, a male was picked up and placed in a vial of alcohol just as a parasitic fungus was noticed protruding from it. The ant had been assumed dead, but after immersion in the fluid it moved sluggishly for a few moments.

The preceding day at Puerto Cabello a colony was found a short distance inland from the open beach. The ants were cutting leaves of a calabash tree about three meters high and their nest was at its base. Major workers were carrying both partially dead and dried leaf sections as well as green leaves.

A colony near Macuto August 16, 1936 nested in a dry stream bed in a slight eminence from which grew a clump of bananas and a cluster of shoots from an old tree stump. The soil was made damp at this spot by leakage or overflow from a small reservoir; elsewhere the area was xerophytic to mesophytic and was characterized by the cactus, *Lemairei (Cereus) griseus*. The coccid-tending ant, *Acropyga (Rhizomyrma) rutgersi* Bunzli was nesting in small chambers anastomosing with those of the fungus grower (see Weber, 1944, p. 106). The *Acromyrmex* nested in a cavity in the old tree stump between two of the shoots which gave the nest admirable protection except for a single opening 125 high, 100 mm. broad and elliptical in from. The fungus garden was 90 mm. inside this opening and was over 250 mm. long, fitting the irregular cavity closely. It was bluish gray externally and contained small masses of substrate which were dark reddish brown to blackish brown in color. The mycelium grew in tufts on the substrate and in the form of somewhat loose bromatia. Pupae were covered with the mycelium but the larvae were largely naked except for occasional mycelial tufts. No large sexual brood was seen. Within the nest were leaf sections exactly comparable to those of *Atta cephalotes*. The ants were aggressive in attacking but were ineffectual since their bites did not break the skin. Domestic chickens of a mongrel breed came by to investigate the proceedingns and ate the ants.

Acromyrmex (Moellerius) balzani Emery, ssp. *planorum* Weber (Fig. 1)

Acromyrmex (Moellerius) balzani Emery, *planorum*, Weber, Rev. Ent. 7: 409, 1937, ♀.

A. (Moellerius) balzani Forel, var., Wheeler, Mosaics and other anomalies among ants, Cambridge, Mass., 1937, p. 8 Pl. II.

The Venezuelan species of *Moellerius* is easily distinguished by its flat eyes, those of *Acromyrmex* being convex. *M. landolti* Forel and *M. balzani* Emery are closely related, the former being originally described from Colombia, the latter from Paraguay. Several forms, including the present, have been attached to *balzani* but may be closer to *landolti*.

The type locality of *planorum* is the llanos about 17 kilometers north of Ciudad Bolivar, a region of Quaternary sediments. It was characterized by my companion, the late Dr. J. G. Myers, as a *Trachypogon-Curatella* savannah. He listed the following plants in the order of dominance within the major groups as follows:

Grasses: Trachypogon plumosus (woolly variant)
(Cymbopogon rufus?) (edge of road)
Andropogon condensatus
Axonopus aureus
Aristida sp.
Paspalum anceps (shade of Curatella)

Other herbs:
Polygala sp.
Paepalanthus capillaceus

Woody plants:
Curatella americana
Bowdichia virgilioides
B. coccolobaefolia
Byrsonima crassifolia
Casearia carpinifolia (in shade of Curatella.)

This was also the habitat of the interesting *Pogonomyrmex (Ephebomyrmex) venezuelensis* Weber, of a *Pseudo-*

myrma in the *Curatella,* of a *Camponotus* tending Aleyrodids on the Trachypogon and of the termite *Nasutitermes (N.) pilifrons* (Holmgren), det. Emerson. *Atta laevigata* occurred a few kilometers away.

The figure (Plate II, left) in the Wheeler mosaic book is from one of my photographs which, however, does not show the nest superstructure (Fig. 1). This was in the form of a striking turret a few centimeters high of grass section which resembled those of certain *Trachymyrmex* except that it was not of clay. At a depth of 140 mm. from the soil level was a chamber 95 mm. high x 95 x 155 mm. in lateral diameters, being elliptical in form. A perpindincular tunnel about a centimeter in diameter led directly from the turret to the side of the chamber. The tunnel continued directly down to a second and smaller chamber which was at a depth of 400 mm. from the soil level. This was 48 mm. high x 50 x 85 mm. Another tunnel led down from the first chamber and past the second chamber, somewhat paralleling the other tunnel and not appearing in the photographs. Also not appearing were the openings in the floor of the first chamber, being four in number and of variable diameter. To one side of the second chamber a tunnel led downward and may have indicated the beginnings of a third chamber but time was lacking for further excavating.

The fungus gardens in both chambers were sessile or supported from rootlets of the *Trachypogon plumosus* grass. The substrate consisted of sections 3-10 mm. long of this and other grasses, some quite woolly. The sections were partly in fascicules, these aggregates having the densest fungal growth. The fungus was in the form of a whitish, loose mycelial network with somewhat circular white cottony patches, small in size and suggesting a loose form of bromatia. Occasional small bodies of a light amber color were interspersed with these (freshly manured bromatia?). These latter were more dense than the white cottony form and may have represented a higher development of bromatia.

Many of the ants were covered with a whitish bloom composed of tiny whitish patches, chiefly on the back of the head, thorax and pedicel. The ants were not vicious and

while they did attack the skin of the fingers little harm was done since the skin was not broken. The larger sizes could bite perceptibly.

ATTA

The Venezuelan term for *Atta* is "bachaco" and the ants are among the best known of insects. It is possible that the leaf-cutting activities of *Atta cephalotes* in the Orinoco Delta may be partly responsible for the nomadic habits of the Indian tribes (*e.g.* the warrau). The Indians laboriously clear a small area in the rain forest and plant it to maize and cassava. Sooner or later the *Atta* find the cassava and proceed to strip the leaves so that the plants may be stunted if not killed. The Indians may leave the area for a new part of the forest rather than attempt to combat the pest. They have other reasons for leaving, of course, including plagues of mosquitoes. During the dry season in the Delta from October to April mosquitoes are so numerous that the people may at least locally move elsewhere to escape them.

The same three species of *Atta* that occur in British Guiana are to be found in Venezuela, *laevigata, sexdens* and *cephalotes* (see Weber, 1946). In British Guiana *laevigata* is found in the savannah areas of the interior while *cephalotes* occupies the northwestern portions and *sexdens* the eastern part of the colony. In the lower Orinoco basin *cephalotes* appears to be the species of the forested Delta while *sexdens* occurs at Ciudad Bolivar in more mesophytic, grass-woodland type of country. Here also *laevigata* appears to be a savannah or llanos species and was taken a few kilometers north of Ciulad Bolivar. *Sexdens* and *cephalotes* are both found at the junction of the Cuyuni and Mazaruni rivers in British Guiana and similarly along the Orinoco a meeting place of the two species will be discovered.

Atta laevigata F. Smith

Atta laevigata, Weber, Rev. Ent., 17: 164 - 165.

The above reference cites the present llanos record and one from the Kukenan River in the Mt. Roraima district.

Colonies were seen on the llanos about three to eight kilometers north of Soledad, the village across the Orinoco from Ciudad Bolivar, nesting under trees as well as in the open. One nest, under bushes and trees, had been dug into by armadillos. There were the usual craters of varying size, some with irregularly elliptical openings 100 x 40 mm. When a twig was thrust down these the large soldiers came out readily, as well as the largest workers. The smallest, of cowrse remained in the fungus gardens. At this time of day (noon) no ants were outside the nest until it was disturbed. Time was unfortunately lacking for further observations.

Atta sexdens L.

The distribution in British Guiana and its apparent absence from that portion of the colony adjoining the Orinoco Delta has been noted above.

A large colony on the Venezuelan Gulf Oil headquarters at Ciudad Bolivar was examined during the dry season on January 25. At this time the ants had about 15 active crater entrances, including six of large size. The largest crater was 24 cm. high and 125 cm. in maximum diameter. The entrances to four large crater were 30, 45, 65 and 65 mm. in diameter respectively, the larger being elliptical and 10-20 mm. wide. The chambers containing the fungus gardens were shallow and spread horizontally, one of 16 x 20 cm. diameter being at a depth of 8 cm., another of similiar dimensions being at a depth of 11 cm. beneath the general soil level or 28 cm. directly beneath the top of a crater. The latter garden contained pupae and larvae. Not all chambers were directly beneath craters, one at a depth of 25 cm. was 40 cm. to one side of the nearest crater entrance. The gardens were elliptical in form to spherical, a representative spherical garden being 14 cm. in diameter. All seen were sessile, resting directly on the floor of the chamber and without contact with the sides or ceiling. No gardens were found at a depth of 60 cm. although hardly 10% of the nest was seen.

The soil in which the ants nested was dry and hard, being a gray to black sandy humus. The hardness necessitated the use of a pick axe in excavating. Despite the general gray to

black color of the soil the craters themselves were distinctly paler and of an orange-brown color. Was this due to formic acid excreted by the ants or to an acid condition of the gradens and excrement excreted on the latter? Seemingly, the color difference was caused by the ants since their whole activities below ground were confined to the same gray to black soil.

The fungus gardens were gray in color and deteriorated rapidly when exposed to the hot, dry air of this day. They gave off a sweetish odor somewhat like sorghum and less like molasses. No bromatia or "kohlrabi" structures were seen in any part of the gradens. The fungus itself was in the form of strands of a white mycelium covering the moist and apparently partly fermented particles of triturated leaves. In an apparent indiscriminate manner eggs were mixed with other brood in the cells of the gardens. A centipede was taken from the corridor to a garden.

What impressed me at the time was the unusually high proportions of soldiers compared with those of a *cephalotes* colony. They seemed easily to outnumber the maxima and media workers. The soldiers were aggressive and not only ruined my new, heavy, all-wool socks by cutting many holes in them but draw blood easily.

Atta cephalotes L. (Fig. 2.)

This ant is doubtless one of the animals important to the human inhabitants of the Delta. Without modern insecticides the people find it exceedingly difficult to exterminate a large colony, a colony which might ruin a crop of cassava or other plants.

It is probably of general distribution throughout the Delta and adjacent rain forests as the following specific records indicate: below Barrancas along the Caño Piacoa; main channel of Rio Grande north of Isla Tortola; between Caños Araguaito and Araguas opposite Isla Sacoroco; Caño Orocaima, tributary to Caño Toro, the latter a branch of the Brazo Imataca.

A young nest was dissected in the fringe forest of the Caño Orocaima along a path used by people living in several huts, (Fig. 2). Nearby was dense rain forest. Externally the nest appeared as a crater 125 mm. in diameter and 30 mm. high; a tunnel 115 mm. long and 23 mm. in diameter led to the nest chamber. This was elliptical, 73 mm. high x 102 mm. wide. Extending down from the first chamber as a continuation of the original tunnel was a cavity 64 mm. deep and 40 mm. wide which probably represented the beginning of a second chamber the original chamber was largely filled by a sessile fungus garden, 70 x 74 mm., which, however, was supported in part by several horizontal roots running though it. The garden was grayish externally, brownish internally. I tasted the inner part and found a suggestion of mushroom flavor; the outer part had a flavor less definable and more pasty.

The queen responsible for the colony was found at one side, supported partly by the roots but also clinging to the garden. She was sluggish and remained in the same place until I finished the excavation. When placed in 93% ethyl alcohol she floated, whereas worker ants sink, indicating that wing and other muscles had been replaced by air.

No maxima workers and no soldiers had yet been reared in this colony although soldier pupae of moderate size were present.

It is possible that the queen came from a mature colony farther along the path. This contained large, possibly sexual, larvae. The young colony queen may have left this colony at the onset of the last rainy season or an earlier one.

On a small island of the Caño Piacoa a mature colony was found by tracing its trails through dense jungle. The island was perhaps 800 meters long and hardly 100 meters in greatest width. At high water during the rainy season the island was clearly reduced to less than half the present size. From the west point of the island ant trails led about 200 meters above water during the rainy season to the nest on the south side, which was six or seven meters at the very most above low water level and probably not more than three meters above water during the rainy season. The trails led from bushes of the sandspit at the west end along the shore

flooded at high tide, as well as among rushes, mangroves, bamboo-like grass *(Gynerium saggitatum)* and other vegetation growing as a dense jungle. Mosquitos were almost unbearable and a noisy hoatzin colony roosted near the nest. These birds and the Attas may well have fed upon leaves of the same plants since the bird crops were filled with green leaves and they did not appear to be wide-ranging.

Chambers containing fungus garden were as shallow as 125 mm. in the nest. The main entrance was at the base of a small tree 85 mm. in diameter. This nest also contained large, possibly sexual, larvae; one after years of preservation still being 8 mm. in shrunken length. It had been killed by the workers in their frenzy when the chambers were exposed.

Trails led in all directions from the nest and it is quite probable that the ants dominated the entire island. A comparable example was found on the tiny island of Kykoveral in the Mazaruni River, British Guiana (Weber, 1946, p. 162).

A large nest on the left bank of Rio Grande opposite Isla Sacoroco was in the form of a low, truncate cone. It was about 1.4 meters high x 3.7 meters in diameter and contained scores of holes, especially on the south side, which were made by large bees. On the north side stood a hard carton nest of termites *(Nasutitermes)* about 65 cm. x 25 cm. in diameter. The termite nest contained small ant brood (not fungus-grower) as well as termites. *Pheidole* and other ants nested in the mound and fly larvae, like trypetid, occurred in a discoid fruit which had fallen on the mound from trees above.

This nest was obviously the center of a biocoenose since it probably was the apex of a small area of soil which was not flooded at high water. The elevation above high tide was estimated to be hardly more than 4.6 meters and during the rainy season water would probably come close to the foot of the mound. It was on a slight slope crowned with a jungle of creepers, prickly and spiny vines and palms and other vegetation. To the south the ground sloped sharply to a depression covered with dense grass, then came a slight rise of vines and bushes and beyond that the sandy beach.

There were many small openings to the nest, none being as much as 10 cm. in diameter. The largest openings were under the termite nest. The fungus gardens were shallow, being under six or so centimeters of reddish-gray clay. Seven or more gardens were exposed and brood was seen in none.

The bees probably used the mound merely as a nesting site. They seemed to be digging horizontally in the upper soil. One was heard buzzing incessantly under the soil and when I cut into it the insect tumbled out of a cell in fungus garden. It had likely borrowed accidentally into this for ants attacked another bee when it was unearthed from an ant tunnel.

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Plate 1

Plate 2

EXPLANATION OF PLATES 1 AND 2

Plate. 1. Nest of *Acromyrmex (Moellerius) balzani planorum* Weber on the llanos. The grass is *Trachypogon plumosus* and formed much of the substrate for the ant fungus garden. The grass turret entrance to the nest has been removed.

Plate. 2. Nest formed by young *Atta cephalotes* queen and her first broods. The queen is clinging to the fungus garden inmediately above the nearer horizontal root.

Photos. N. A. Weber.